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ANNUAL INCREMENT NORMS FOR TEN MEASURES OF PHYSICAL GROWTH ON CHILDREN FOUR TO EIGHT YEARS OF AGE

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An article by Shuttleworth (6) published in this Journal in 1934 made a plea for anthropometric norms "stated in terms of annual or semiannual gains . . . in terms of progress" (6, p. 89). The present paper provides such norms for four consecutive yearly age periods in early childhood. To this extent the paper constitutes a fulfillment of Shuttleworth's forecast that "future work" would "move in the direction" of supplying norms "in terms of increments" (6, p. 89).

Analyses of body increments for some portion of the age span covered in this study (i.e., four to eight years) have been reported by Shuttleworth (6), Simmons and Todd (7), Meredith (2), Robinow (5), Jenss (1), Reynolds and Sontag (4), and Meredith and Carl (3). Taken collectively, these investigations contain findings for but three—stature (2, 4, 5, 6, 7), weight (1, 4, 5, 6, 7), and hip width (3)—of the ten aspects of growth dealt with in the present paper. Only one of the investigations, that of Simmons and Todd, extends over the entire interval from four years to eight years. In this instance, the findings consist of means and standard deviations computed from annual increment values for stature and weight.

Intelligent use of any biologic "frame of reference" necessitates a sound functional knowledge of the materials and procedures used in its construction. Briefly, the "frame" to be presented here was derived by subjecting morphologic increment data on well-nourished nonpathologic, white children to a percentile method of norm development.² With this overview, we pass to more explicit characterization of the sample, the basic data, and the steps followed in norm construction.

The subjects utilized in the study were children four to eight years of age enrolled between 1937 and 1949 at the University of Iowa experimental preschool laboratory and elementary school. All were physically normal children of northwest European ancestry representing the professional or

¹ The first author supervised collection of the data for this study while a member of the staff of the Iowa Child Welfare Research Station, University of Iowa. The data were analyzed and prepared for publication after transfer to the University of Oregon.

² Shuttleworth, in his 1934 paper, noted that "some distributions of increments are skewed" and suggested the use of percentiles in increment analysis.

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managerial socioeconomic groups. The environmental conditions with reference to nutrition and health care were generally superior; in most instances the children had been under continuous pediatric guidance from birth. The control of the sample in regard to reasonably adequate care is especially important, yielding preferred materials from which to construct norms for growth appraisal.

Always the anthropometric examinations were made within three days of a subject's birthday. Consequently, the increment norms for "Age 4 to 5 years" are based exclusively on data from children measured at or very near age four and again at or very near age five (the increment values themselves being derived by subtracting the child's measurements for age four from his measurements for age five). Parallel statements hold, of course, for the norms representing the annual intervals five to six years, six to seven years, and seven to eight years.

As will be seen from Table I, increment norms have been developed for each of these four yearly age periods covering weight, stature, stem length (overall length of head, neck, and trunk), three dimensions of the trunk (shoulder width, hip width, and chest circumference), and four dimensions of the extremities (upper limb length, lower limb length, arm circumference, and leg circumference). Except for upper limb length the number of children examined in obtaining the paired series of measurements for the beginning and end of each annual period was as follows:

Subjects	Age in years:			
	4-5	5-6	6-7	7-8
Males	80	90	100	90
Females	80	90	100	90
Total	160	180	200	180

In the case of upper limb length, the increment values were derived from initial and terminal measurements for the four successive one-year intervals on 86, 100, 132 and 128 children (50 per cent of each sex).

The anthropometric technique employed in obtaining the ten measurements was as follows:

Weight. Weight, in common with all of the other measurements, was determined nude. The child stood in the center of the platform on beam-type scales. At the time of reading a weight, care was taken to observe that the child's hands were not in contact with the head portion of the scales, with the wall, or with any other object. The scales were checked frequently and, whenever necessary, adjusted.

Stature. Erect body length was measured using an upright board (to which was attached a Baldwin millimeter scale) and a wooden square. The child stood with heels almost together, and with heels, buttocks, up-

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TABLE I

ANNUAL INCREMENT NORMS FOR TEN MEASURES OF PHYSICAL GROWTH
(Construction sample: Well-nourished U.S. white children of both sexes)

		Small Gain	Moderately Small Gain	Average Gain	Moderately Large Gain	Large Gain
AGE FOUR TO FIVE YEARS						
Weight (lbs.)	Under	3.2	3.2-4.2	4.3-5.8	5.9-7.3	Over 7.3
Stature (cm.)*	Under	6.0	6.0-6.4	6.5-7.4	7.5-8.0	Over 8.0
Length: Stem	Under	2.2	2.2-2.5	2.6-3.1	3.2-3.5	Over 3.5
Upper limb	Under	2.7	2.7-2.9	3.0-3.6	3.7-4.0	Over 4.0
Lower limb	Under	3.3	3.3-3.7	3.8-4.4	4.5-4.9	Over 4.9
Width: Shoulders ..	Under	0.7	0.7-1.0	1.1-1.5	1.6-1.9	Over 1.9
Hips	Under	0.6	0.6-0.7	0.8-1.1	1.2-1.3	Over 1.3
Girth: Chest	Under	0.3	0.3-0.9	1.0-2.0	2.1-3.0	Over 3.0
Arm	Under	-0.1	-0.1-0.1	0.2-0.6	0.7-1.1	Over 1.1
Leg	Under	0.3	0.3-0.5	0.6-1.1	1.2-1.6	Over 1.6
AGE FIVE TO SIX YEARS						
Weight (lbs.)	Under	3.3	3.3-4.4	4.5-6.3	6.4-8.4	Over 8.4
Stature (cm.)*	Under	5.7	5.7-6.1	6.2-7.1	7.2-7.7	Over 7.7
Length: Stem	Under	2.0	2.0-2.3	2.4-2.9	3.0-3.3	Over 3.3
Upper limb	Under	2.5	2.5-2.7	2.8-3.4	3.5-3.8	Over 3.8
Lower limb	Under	3.2	3.2-3.6	3.7-4.3	4.4-4.8	Over 4.8
Width: Shoulders ..	Under	0.7	0.7-0.9	1.0-1.4	1.5-1.8	Over 1.8
Hips	Under	0.5	0.5-0.6	0.7-1.0	1.1-1.2	Over 1.2
Girth: Chest	Under	0.4	0.4-1.0	1.1-2.1	2.2-3.1	Over 3.1
Arm	Under	0.0	0.0-0.2	0.3-0.7	0.8-1.2	Over 1.2
Leg	Under	0.4	0.4-0.6	0.7-1.2	1.3-1.7	Over 1.7
AGE SIX TO SEVEN YEARS						
Weight (lbs.)	Under	3.4	3.4-4.6	4.7-6.8	6.9-9.4	Over 9.4
Stature (cm.)*	Under	5.3	5.3-5.7	5.8-6.7	6.8-7.3	Over 7.3
Length: Stem	Under	1.8	1.8-2.1	2.2-2.7	2.8-3.1	Over 3.1
Upper limb	Under	2.3	2.3-2.5	2.6-3.2	3.3-3.6	Over 3.6
Lower limb	Under	3.0	3.0-3.4	3.5-4.1	4.2-4.6	Over 4.6
Width: Shoulders ..	Under	0.7	0.7-0.9	1.0-1.4	1.5-1.7	Over 1.7
Hips	Under	0.5	0.5-0.6	0.7-0.9	1.0-1.1	Over 1.1
Girth: Chest	Under	0.5	0.5-1.1	1.2-2.2	2.3-3.2	Over 3.2
Arm	Under	0.1	0.1-0.3	0.4-0.8	0.9-1.3	Over 1.3
Leg	Under	0.5	0.5-0.7	0.8-1.3	1.4-1.8	Over 1.8
AGE SEVEN TO EIGHT YEARS						
Weight (lbs.)	Under	3.5	3.5-4.8	4.9-7.3	7.4-10.4	Over 10.4
Stature (cm.)*	Under	4.9	4.9-5.3	5.4-6.3	6.4-6.9	Over 6.9
Length: Stem	Under	1.6	1.6-1.9	2.0-2.5	2.6-2.9	Over 2.9
Upper limb	Under	2.1	2.1-2.3	2.4-3.0	3.1-3.4	Over 3.4
Lower limb	Under	2.8	2.8-3.2	3.3-3.9	4.0-4.4	Over 4.4
Width: Shoulders ..	Under	0.7	0.7-0.9	1.0-1.3	1.4-1.6	Over 1.6
Hips	Under	0.5	0.5-0.5	0.6-0.8	0.9-1.0	Over 1.0
Girth: Chest	Under	0.6	0.6-1.2	1.3-2.3	2.4-3.3	Over 3.3
Arm	Under	0.1	0.1-0.4	0.5-0.9	1.0-1.4	Over 1.4
Leg	Under	0.5	0.5-0.8	0.9-1.4	1.5-1.9	Over 1.9

* The values for this and the succeeding dimensions are expressed in centimeters.

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per part of back, and rear of head in contact with the board. As the square was brought down upon the vertex (the highest point of the head when the head is oriented with the tragion-orbitale plane at right angles to the long axis of the body), care was taken to see that (a) the child kept the plantar surface of his heels firmly upon the floor, and (b) no obstacles, such as combs, clasps or braids, prevented the square from making contact with the vertex.

Stem length. In taking this measurement, a horizontal bench 30 cm. in height was placed at the base of the upright board used in obtaining stature. The child sat on this bench with his ankles crossed, his knees spread apart, and the posterior aspect of his trunk in contact with the board both at the sacral and upper thoracic regions. Stem length was determined as the distance from the surface of the bench to the vertex. It follows that stem length is synonymous with sitting height.

Upper limb length. This measurement was taken on the left extremity using wooden sliding calipers. After extending the extremity at the side of the body and rotating the hand so that its palmar surface faced the lateral surface of the thigh, the distance was found from the most lateral point of the acromion process to the most distal point of the middle finger. The instrument was applied from the rear, care being taken to keep its shaft parallel with the long axis of the limb and to guard against the tendency of many children to tilt the shoulder axis as the limb is extended.

Lower limb length. Length of the lower extremity was derived by subtracting a subject's stem length from his stature. (It will be noted in Table I that for the four-year segment of ontogeny under study, corresponding increments consistently are higher for lower limb length than for upper limb length, and higher for upper limb length than for stem length.)

Shoulder width. Sliding metal calipers having broad flat aluminum branches were used in taking this and the succeeding measurement. The shoulder breadth obtained was bi-acromial diameter. Each child stood with upper extremities extended downward and the shoulders neither "slumped forward" nor "thrown back." Moderate pressure was applied against the branches of the calipers in order to have the record approximate the skeletal distance between the most lateral points of the acromion processes.

Hip width. This measurement was determined as the distance between the lateralmost point of the crest of the right ilium and the corresponding landmark for the left ilium, i.e., as bi-iliocristal diameter. After each branch of the calipers had been brought squarely in contact with one of the landmarks, heavy pressure was used in order to approach maximum compression of the overlying soft tissues. In the event the child turned his hips as the pressure was applied, the measurement was retaken.

Chest girth. The instrument used in taking all of the girth measurements was a steel millimeter tape. Chest girth was determined as the cir-

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cumference of the thorax at the level of the xiphisternal junction. In preparation for measurement each child stood in a natural manner with head erect and with the upper extremities relaxed and held slightly away from the sides of the body. The tape was passed around the trunk in a horizontal plane at the xiphisternal level and brought into light contact with the skin. The reading made was the median girth during normal respiration.

Arm girth. The measurements of arm girth and leg girth were taken on the left side. For measurement of arm girth the child stood in a natural manner with the upper extremities hanging in a relaxed condition at the sides of the body and with the left extremity slightly abducted so that the arm was not in contact with the lateral wall of the thorax. The tape was passed around the arm approximately halfway between the shoulder and the elbow. This area was explored to find the greatest girth at right angles to the long axis of the limb and inferior to any surface indication of the deltoid muscle. The reading was taken with the tape in sufficiently light contact with the skin to avoid compression of the tissues.

Leg girth. The child stood with his feet about six inches apart and his weight distributed equally through both lower limbs. Maximum circumference of the left leg was determined by passing the tape around the leg in the region of the calf and exploring to find the largest reading at right angles to its long axis. As for arm girth, the tape was read at "light contact" tension.

All of the records were secured with exceptional care. At every examination, each measurement was taken by two different anthropometrists. In instances where their results failed to show close agreement (i.e., agreement within 0.1 cm. for hip width and leg girth; 0.2 cm. for stature and arm girth; and 0.4 cm. for stem length, upper limb length, shoulder width, and chest girth), additional measurements were made. This degree of research rigor was initiated in 1937 and maintained throughout the twelve years of data collection in order that the obtained increments would not differ appreciably from true biologic values, and, therefore, would constitute highly valid data for the development of increment norms.

The norms are presented in Table I. Inspection of this table promptly leads to the question: What procedures were followed in establishing the five normative categories, Small gain, Moderately small gain, Average gain, Moderately large gain, and Large gain? In other words, how were the norms constructed?

First, annual increments were derived from the basic measurements (by subtraction) and these increments separated according to the age interval and body dimension represented. That is, weight gains for each of 160 children weighed at ages 4 and 5 years were computed and placed together in one series, the stature increases for the same 160 children (80 males and 80 females) measured at like ages were computed and placed in a

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second series, and so forth. Next, each series of increments was arranged in order from the highest value (largest gain) to the lowest (smallest gain, or, greatest loss) and the 90th, 70th, 30th, and 10th percentiles determined. Finally, these four percentiles were used to delimit five increment categories.

The 30th and 70th percentiles were employed as the limiting values for the normative category designated "Average gain"; the 10th percentiles as the lower limits of the category captioned "Moderately small gain"; and the 90th percentiles as the upper limits of that captioned "Moderately large gain." This means, for each ordered series in turn, that the "Small gain" category was specified (quantitatively defined) by the lowest 10 per cent of the increments, the "Moderately small gain" category by the next 20 per cent, the "Average gain" category by the middle 40 per cent, the "Moderately large gain" category by the next 20 per cent, and the "Large gain" category by the highest 10 per cent.

The foregoing description of the source and nature of the norms—of where, how, and on whom the basic data were collected and by what procedures increment values were obtained and normative categories delimited—has laid the necessary foundation for a sound working understanding of their interpretation and use.

As a means of starting the reader to think concretely about the applicability of the norms, it may be helpful to append an illustration or so. Assume that child L is measured at ages 4 and 5 years in accordance with the methods described in this paper and is found to register gains of 5.0 lbs. in weight, 3.0 cm. in stem length, 1.5 cm. in shoulder breadth, and 2.0 cm. in chest circumference. Reference to the norms shows these to be "Average" gains for the annual interval under consideration, i.e., in each aspect of growth followed, the child's increases rank among those of the middle 40 per cent of well-cared-for United States white children of northwest European ancestry. Again, assume child M has been carefully measured at 5 and 6 years of age and has yielded increments of 3.0 lbs. for weight, 2.5 cm. for length of the upper extremity, 3.0 cm. for length of the lower extremity, and 0.4 for leg circumference. Reference to the norms suggests the advisability of a thorough pediatric appraisal—these "Small" increments may be those of a healthy slow-growing child or those of a child who would grow more rapidly as a consequence of prescribed changes in the daily regimen. Finally, assume that child T makes gains between 6 and 7 years of age of 4.0 lbs. in weight, 7.0 cm. in stature, 1.0 cm. in hip breadth, 0.2 cm. in arm circumference and 0.5 cm. in leg circumference. The discrepancy between the "Moderately large" gains in the skeletal measures (stature and hip width) and the "Moderately small" gains for weight and the soft tissues of the arm and leg may have clinical significance, i.e., medical examination is warranted to determine whether the norms are reflecting an undesirable state of health arising from some disease condition, nutritional need, and/or activity deficiency.

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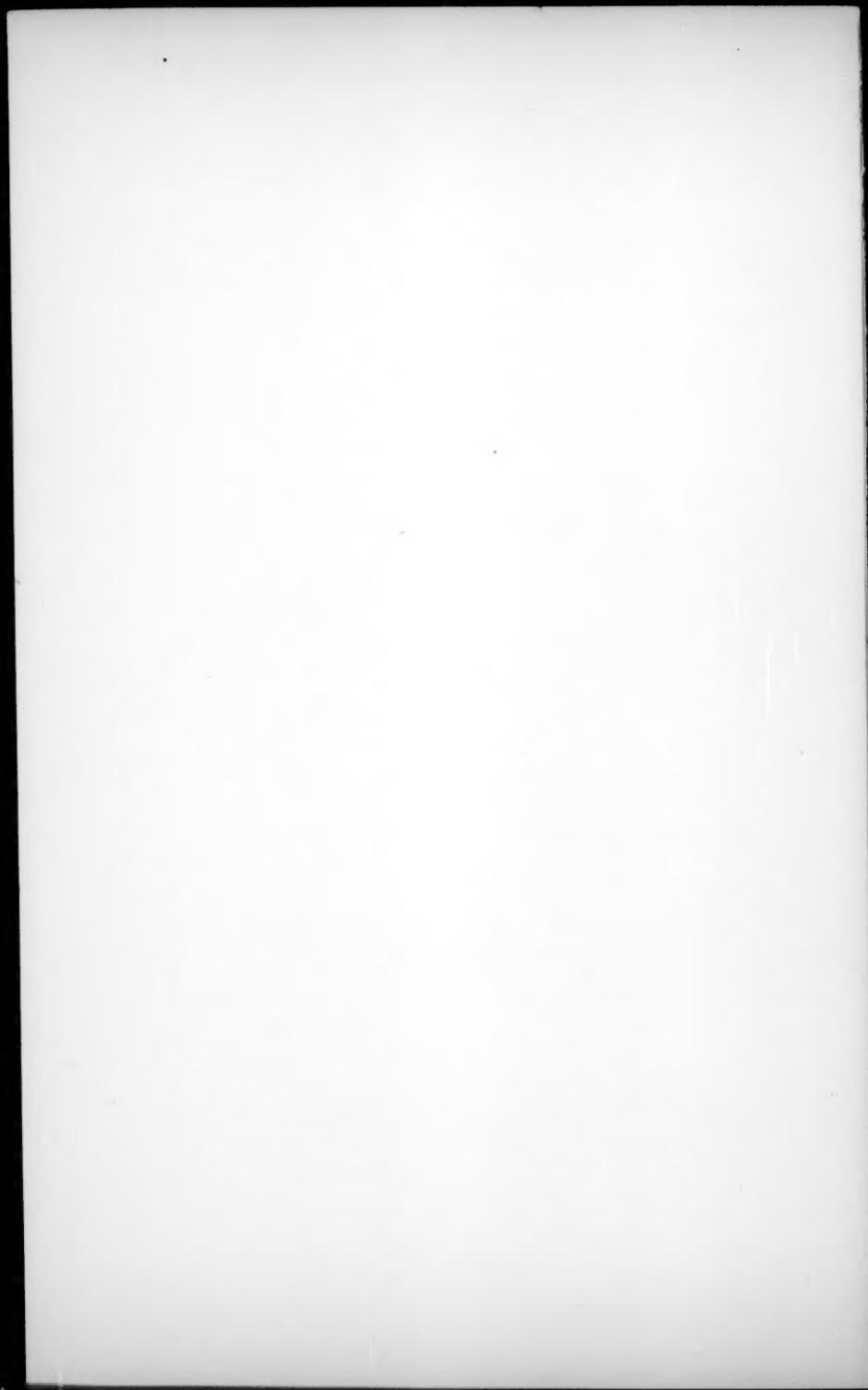
SUMMARY

Annual increment norms covering the age period from four to eight years are presented for ten measures of physical growth. Description is given of the source and size of the sample, the anthropometric procedures followed in collection of the basic data, and the methods of increment derivation and norm construction. Illustrations suggest some applications of the norms.

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A STUDY OF TOYS FOR HOSPITALIZED CHILDREN¹

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This report covers a study of the suitability of various types of toys for hospitalized children. The purpose of the study is (a) to discover types of toys that are of greatest interest to hospitalized children of different ages; (b) to investigate factors that make a given toy suitable or unsuitable for hospital use; and (c) to arrive at some conclusions concerning the usefulness of toys in a pediatric ward that might have implications for similar hospital situations.

This study, which is one of several initiated by the American Toy Institute,² was conducted in four pediatric wards of a large city hospital over a period of three months. During the time covered by this study, the use of toys was observed on 291 occasions. A variety of toys was selected and used (see Table I) with a view to studying as many different types of toys (i.e., imaginative, manipulative, etc.) as was feasible. The observers who assisted the writer were all people working in the hospital at the time; they observed the children's use of toys in the course of their regular hospital duties.

THE HOSPITAL SITUATION

The four wards used in this study were: cardiac; general medical; ear, nose and throat; and tuberculosis. No special provision or change of hospital routine was instituted since one aim was to observe the uses of toys in the usual hospital situation.

Each of the wards had one large room with cribs or beds lined up on each side, and several smaller rooms housing individual patients in isolation, or two to four children. There were no partitions between the beds. The wards were all in the same building of the hospital but were not adjoining.

The hospital routine varied from floor to floor but always included baths, temperature taking, medications and examination by the doctors in the morning; meal and nap at noon; temperature taking, medications and necessary treatments in the afternoon.

¹The author would like to thank Dr. Arthur T. Jersild, Professor of Education, Teachers College, Columbia University, and Dr. Grace Langdon, Child Development Adviser to the American Toy Institute (Research Division of the Toy Manufacturers of the U.S.A., Inc.) for their valuable help in connection with this study.

²For a report of one of these studies see Langdon, Grace. "A Study of the Uses of Toys in a Hospital," *Child Development*, 19, 197-212, 1948.

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TABLE I
INVENTORY OF OBSERVATIONAL DATA

Play Material	No. of Occasions Use Was Observed	Age Range of Children	Approximate Range of Play Time (in minutes)
<i>Balloons</i>	55	6 mo.-11 yrs.	10-120
<i>Active Play Toys</i>			
Pull-toys	28	2-8 years.	20- 90
Baby crib toys (could be strung across crib, or strapped to one side)	9	4-15 mo.	2- 10
Bench with 6 pegs (pegs may be hammered down and are then delivered through a runway at the bottom of the toy)	5	3½-5 yrs.	20- 30
<i>Construction Toys</i>			
Unpainted set of wooden blocks, train tracks and train	15	4-11 yrs.	45-120
Large blocks with colored dots imprinted. Resemble dominoes	15	3½-10 yrs.	20- 60
<i>Imaginary Toys</i>			
Nurse and doctor kits	23	4-12 yrs.	60-120
Family of dolls	20	4-11 yrs.	15-120
Bathroom and livingroom doll furniture	20	3-10 yrs.	10- 60
Set of small wooden warships	10	4-11 yrs.	10- 45
Telephones	10	2½-10 yrs.	10- 60
Six wooden milk bottles in a rack	8	2-8 yrs.	15- 45
<i>Manipulative Toys</i>			
Wooden shoe that may be laced. Has small mother and children dolls that fit into shoe	20	5-7 yrs.	30
Imitation mail box with a set of various shaped blocks that fit into corresponding holes in the box	15	2-8 yrs.	15- 30
Jointed figures that move when their base is pressed	10	4-11 yrs.	5- 15
Colored flat triangles that can be pieced together to make designs	8	7-11 yrs.	10- 30
Ball strung on an arched wire. When a finger pedal is hit the ball travels over the wire	6	10 mo.-8 yrs.	5- 30
Inlay puzzles	6	7-12 yrs.	5- 30
An upright rectangular box with a handle. When pumped, releases a ball through a small opening near the bottom of the box	5	2-5 yrs.	45
Doll head with long woolen yellow hair	3	7, 10, 11 yrs.	15- 60

Total number of toys: 20

Total number of occasions use of toys was observed: 291

NOTE: All the toys were used by both bedfast and ambulatory patients with the following exceptions:

Bedfast only: shoe lacing, peg-hammer bench, baby crib toys

Ambulatory only: milk bottles in rack, block sets after first few observations.

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Parents were allowed to visit for two hours every Thursday and Sunday. The number of nurses was minimal, never more than three, and frequently one, even on the busier wards. There were usually one or two attendants on a ward.

DISTRIBUTION OF TOYS

Toys were given to the children during the morning and afternoon, and occasionally in the evening after temperatures had been taken and treatments done,—times when nothing else was scheduled for the children. This usually included a period of one hour in the morning and two hours in the afternoon.

PLAY SITUATION BEFORE THE STUDY

Prior to the study, provision for play in the hospital was limited to a small play room for ambulatory children and an occupational therapist who moved from ward to ward with her rather limited variety of toys. Toys used by the occupational therapist were kept in a central cabinet and not left on the wards.

There was no space provided for toys on the wards except for two small cabinets on the cardiac ward. There was no organized opportunity for the nurses or attendants on the wards to make use of the toys in the regular routine of the hospital day, nor for the child to use the hospital toys except when an occupational therapist was on the wards. This seemed to be due more to the attitude about toys of the particular head nurse on the ward rather than hospital policy, as the head nurse on the cardiac ward had a few toys in her cabinets to which the children had access during the day. No regular evening recreation or use of toys was available on any of the wards.

The severe circumstances under which the study was conducted makes even more gratifying the permissiveness to continue the study granted by the physicians, supervisors, and head nurses.

THE CHILDREN

The children studied are only partially representative of the hospital population in the United States. Being patients in a city-financed institution, they were mostly from the lower and lower-middle socio-economic groups. Approximately one-fifth of the children in this study came to the hospital from boarding institutions, either state or parochial, or were permanent residents of the hospital. Permanent residents included those children who were born in the hospital and because of some slight or serious birth anomaly remained in the hospital; their parents did not feel they could care for them at home, and other institutions did not accept them because of the anomaly. There were also some children from other institutions with a slight disease, such as ringworm of the scalp, who were hospitalized for necessary prolonged treatment.

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The hospital, naturally, had many patients from the neighborhood surrounding it. It is a crowded neighborhood, fairly stable and heavily populated. Most of the buildings are five-story walk-ups. The buildings are old and many are in ill repair. Many of the children who came to the hospital from the neighborhood had few toys to play with at home. In many ways, therefore, the use of the toys might be less skilled, less sophisticated, than in a hospital caring for more privileged children. However, this situation is probably duplicated in many large city hospitals throughout the country.

The four wards used in this study had the following approximate daily number of children:

Tuberculosis	35-40
Cardiac	15
General Medical	35-40
Ear, Nose and Throat	20

Most of the children on the tuberculosis and cardiac wards in the beginning of the study were also present at the end. On the general medical floor and especially on the ear, nose and throat ward, there was a more rapid turnover. Children admitted to the latter two wards were usually acutely ill, but with treatment became ambulatory and ready for discharge quickly so that their hospital stay often was a matter of only a week or two. On the other hand, the children on the tuberculosis and cardiac wards had illnesses of a more chronic nature and were often in the hospital for several months.

All wards provided care for children of all ages, with all degrees of inability due to illness. Grouping in this hospital was according to disease. The age range of children used in this study by wards is as follows:

Tuberculosis	2½ to 5 years
Cardiac	4 to 12 years
General Medical	2 to 12 years
Ear, Nose and Throat	4 months to 12 years

Many of the children on the tuberculosis ward felt well and desired activity while the nature of their illness required rest and inactivity. A compromise was established whereby the children were allowed out of bed to sit around a table cut to their size for play. They were not allowed, however, during this play period to run about. As tuberculosis is a long-term disease most of these children were in the hospital for many months.

The problem on the cardiac ward was somewhat the same, except that older children were also included, and frequently these youngsters did not feel up to par. The majority of the patients on the cardiac floor were in bed, and had been for a long period of time. They felt weak and frequently their morale was poor. Actual physical movement, as well as excitement, on both these wards had to be kept to a minimum.

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The general medical ward presented as many play problems as there were varieties of illnesses. Among others, there was a child badly crippled by arthritis, an acutely prostrated child with spinal meningitis and an ambulatory boarder with ringworm of the scalp.

On the ear, nose and throat ward, play approximated what may be seen in the schools and on the playgrounds. These children, whose illness usually was acute rather than chronic, seemed typically to be lonesome when first admitted; they soon felt well enough for active group play, however, and were, for the most part, out of bed.

TOYS USED

The 20 different toy materials used were provided by individual manufacturers, members of the Toy Manufacturers of the U.S.A., Inc. Toys were selected to provide for all the ages represented in the study, for individual and group play, and for children isolated because of infectiousness. It was kept in mind that, to be practical for hospital use, toys must be easy to clean and to store, and must be neither noisy nor require strenuous physical exertion.

The toys used fell roughly, with inevitable overlapping, into the following groups: active play, constructive, imaginary, and manipulative toys (see Table I above. The toys are described rather than listed by trade name, but the description of each toy, it is hoped, is sufficiently clear to enable a prospective user to locate a similar toy).

METHOD AND SCOPE OF OBSERVATION

Three observers helped the author collect data for the study. The author is a registered nurse who was working at her profession at the time the study was conducted. She was assigned to the ear, nose and throat ward and was with the children five days a week, either from 8:00 a.m. to 4:30 p.m., or from 3:30 p.m. to midnight. Of the other observers, one was a nurse who had been assigned to the play period of the tuberculosis group. She was with the children only during that time of the day (morning or afternoon, usually both) that was set aside as playtime. The two other observers were nursery school teachers assigned to the hospital expressly to provide recreational therapy. They brought the toys to the children on the cardiac and general medical wards every week day, in the morning and afternoon.³

The period of study was from the middle of October to the middle of January, 1947-1948. During this period 291 observations were made of the children using the 20 toys. Observations during evening time, when the children were apt to be tired, and weekends, when treatments were kept to a minimum, were made only by the author.

³ The author wishes to thank Mrs. Clara Ruskin, R.N.; Miss Mary Lombardy and Miss Jean Nicholson for the many hours they spent observing the use of toys by the children.

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How the Toys Were Presented

On all but the ear, nose and throat ward, the toys were brought to the children and removed after the play period. The children were allowed to choose the toys with which they wished to play. If a child had no choice, a toy, usually one new to him, was given him, together with a short introduction to it, if necessary. Suggestions as to use of the toy, after the child was oriented to it, were not made. The only other involvement of the observers in the children's play was occasionally as an arbitrator in the settling of disputes regarding property rights. It was thought that minimal interference was what normally would be expected in a hospital. Ordinarily a pediatric ward is a busy place with the attendants and nurses bathing the youngsters, making beds and giving treatments; physicians coming and going, examining children, and making rounds. There are always adults about and contact with the children and their play and disputes is inevitable. However, toys cannot take much of the nurses' time as hospital wards are now arranged. Often, in fact, toys can take no more than is needed to distribute and collect them, as the nurses are frequently too busy with routine duties.

Recording the Observations

Emphasis was placed, in recording the observations, upon accurate and exact recording of the use of the toy by the child. Verbatim records of children's comments were taken when possible. The observers carried pencils and small pads and jotted down notes while observing the child and later transcribed the information on the record sheet (see below).

INFORMATION COLLECTED IN CONNECTION WITH EACH OBSERVATION OF A CHILD WITH A TOY

Name of Toy Child Using Toy

Sex

Age

Diagnosis

Approximate socio-economic status

Length of time child in the hospital

Additional information about the child, such as IQ, usual behavior, whether from an institution or not, special problems, etc.

Use of Toy

Toy given child or child's first, second choice

Length of time child played with toy

Description of use of toy

Interpretation and Evaluation

Observer's impression of the values of this toy in the hospital

Suggestions for changes in this toy to make it more adaptable for use by children with this disease in a hospital

Other suggestions and random thoughts; including notes on whether toy was used in group play, under what conditions the toy broke or parts were lost, etc.

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It was impossible to record the exact amount of time spent with a toy because the children would leave a toy, go back to it, combine several toys in play, and then return to the first one. Actually, children responded initially to the toys in a great variety of ways that could not be described or measured by taking account of objective behavior. A child might be thinking about a toy, or constructing play in his mind while not actually playing with the toy.

It was also felt that the amount of time spent with a toy tells little of importance about the way it was used. Some children who felt ill would play intensely for a short time apparently projecting much of their anxiety about an imminent operation or visiting hours, and then leave the toy either for some kind of play that seemed less dynamic or was less strenuous; others would sit for a long time with a toy, not playing with it, but seeming to derive comfort from just having the toy near by. Others would go from toy to toy, trying one after another until they found one which they chose day after day.

The toys seemed to have special meanings to different children and were used in different ways. Although toys by themselves cannot be the answer to the troubled mind of the young child torn from his usual home routine, from the protection of his mother, and faced with a new group of children, perhaps with an operation, often with painful treatment, and with strange men and women in white uniforms,—still toys often were the only things to which the child could turn that he could understand.

FINDINGS

It may be recalled that one purpose of the study was to get information that would be significant and useful to others working in similar hospital situations. This, of necessity, is of a more or less empirical nature.

The number of observations of a toy (see Table I) cannot be considered as an absolute index of interest. The children did not always have a choice. Often the toy one might have chosen was being used by another child. However, in a gross way this inventory can point out which toys were most frequently used.

Balloons

Balloons were enjoyed by every age group and were in constant demand by children with all kinds of diagnoses, while they were available. The great versatility of the balloon seemed especially appealing for use in the hospital. The children who were more active could bat the balloon to the ceiling, those in bed could make it an old man, an aircraft or an animal with a little paste and paper. The balloon was vivid in color and served as diversion for children with hospital-weary eyes. Children too ill to play were given a balloon tied onto their cribs. These youngsters watched the balloons, occasionally reached out to touch them, and frequently demanded that the balloons be taken to X-ray, etc., with them. So even when active

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play was impossible the child seemed to derive comfort from having a toy by him, as though it represented an object from his own world.

Mickey Mouse balloons were most in demand, especially by children who were out of bed. The long twisty balloon ranked next in popularity. Red was universally the most popular color.

Pull-Toys

Pull-toys came next in frequency of use. Perhaps they were so popular because the confined child needed activity and these toys gave some meaning to his trot around the ward. Pull-toys were used mainly by the 2-to-5-year-old group but were not scorned by the 6-to-8-year-olds.

The realistic toys—a pony that pulled a cart, a dog that wagged his tail, and a duck that quacked—had greater appeal than Mickey Mouse, Donald Duck and other Walt Disney figures.

The pull-toys really needed to be pulled to have an appeal—no interest was shown in a pull-toy by a child confined to bed even when the top of the bedside stand was placed in bed with the child so he could push the toy and hear the bell clang or the duck quack.

Imaginary-Play Type Toy

Response to the projective, imaginary-play types of toys—including the nurse and doctor sets, family of dolls, the set of track and train blocks—was constant and enthusiastic. It was not uncommon for a group of ambulatory patients to include a bed patient in their play with these toys. When it was felt that this was too stimulating for a bed patient, he played by himself acting out scenes, such as his separation from his mother, or the recent treatment he had endured.

Hospital drama was repeated day after day in children's play with the nurse and doctor sets. Routines were accurately followed, even to charting. Some of the observations of this play enabled even the untrained nurses to gain some insight into the feelings of the child about his hospital experiences. For example, almost invariably the "patient" was so uncooperative to play medication and examination that three "nurses" had to hold him down, even though these same children almost always were cooperative to actual medication. Not once was a child observed being tender or careful with her "patient," even though the real nurses and doctors frequently were. Perhaps the children regarded the treatments themselves as unkind and threatening acts, and their position as patients in a hospital as an unkind and threatening situation.

The children not only often replayed their experiences but also turned the tables on the doctors and nurses. The observer had her temperature taken, took "pills" (even though they "taste terrible") had her chest poked, ears looked into and received many "needles." The family of dolls had similar fates.

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Each of the imaginary toys found sponsors in all ages of children over three years, in bed and out. The acutely ill child used them less frequently than the chronically ill or the convalescent. The children used these toys in play that seemed important to them. Whether it was a city constructed with the set of blocks, train and track that was bombed, or the little girl in the family of dolls that died from an agonizing disease, the toys seemed to serve as vehicles for the expression of the fears, lonesomeness and anxieties of the child in the hospital; they provided opportunity for the child to express his feelings about hospitalization, treatments, and operations.

Construction Toys

The construction toys—large domino-like blocks and the set of blocks, train, and track—as a group, were popular. There was one each of these, and they were in such demand that their use had to be scheduled so that each child who wanted to build with them might have an opportunity to do so. Even so, the boys monopolized the toys and few observations were made with girls. While it might be true that the toys were so popular because there was not enough to go around, it did seem that the appeal that these toys had for the children was one prompted by the nature of the toys.

The toys were used by all ages of children. However, it was found that the large blocks were too heavy for bed play and the smaller set too "tippy," so use was confined to ambulatory children. The younger children built simple designs and did not have as long an interest span as the older group, even though they tended to play more with the structures they had made. The toys led to group play, and as the architects frequently had different construction ideas, to situations that required supervision. Even though this was time-consuming, the incentive that these toys afforded to constructive activity, particularly for children who did not feel too strong but were ready for inventive activity, gave the construction toys a well-earned place in the hospital cabinet.

Manipulative Toys

Some of the manipulative toys, such as the toy that moved in response to having its base pressed, the doll's head, and puzzles, did not have the appeal that was expected. After a child had manipulated the toy and had seen it perform, it no longer seemed to be challenging. It seemed as if the children who felt well enough to really enjoy toys preferred more active or more imaginary toys.

The jointed figures that moved when their base was pressed were picked up by many children for the novel situation they presented. However, interest was of short duration and the children soon turned to other activities. More than momentary interest could not be elicited from any child in bed, even when he had nothing else to play with. The research did not extend to the field of rehabilitation. In this capacity these toys might have

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real value. For example, a child could be stimulated to finger activity and judge the amount of progress he was making in mastering the muscles of his hand or arm by the movements of the figures or the ball.

The postal box, shoe lacing, and peg-hammer bench, all had enthusiastic following by 3-to-5-year-olds who were either in bed or not allowed run-about activity.

Frequently a child would occupy himself an entire morning with one of these toys. The shoe lacing toy, for example, was especially adaptable for a long period of play, for after the child tired of lacing the shoe, there were unlimited possibilities of play with the small mother and her many children who lived in the shoe.

The puzzles elicited moderate interest. The solid blocks of bright color seemed inviting, but many of the children found them too difficult to complete.

Baby Crib Toys

Not many observations were made on the baby crib toys, but since the infants could not have a free choice this does not indicate a lack of interest. It was found that the toys distracted the infants from their crying and served to provide them with exercise they probably would not have otherwise. Only two of the nine infants were strong enough to pull themselves up by the toys, but the others paddled the toys with their hands and feet, and laughed heartily at the motion and noise they had created.

CONCLUSIONS AND PRACTICAL OBSERVATIONS

Relating to Toys

From the 291 observations made in this study on the use of various toy materials by hospitalized children, several conclusions that may be applicable to the selection of toys in other hospitals may be suggested.

1. From the viewpoint of durability, construction of the individual toy is important. The toys in this study received vigorous, hard use, and many of them were intact at the end of the period of observation. Those inaccurately jointed, poorly constructed, and composed of many loose parts were among the casualties.

2. Noisy toys are disturbing to both staff and other patients and are not desirable. For example, in this study when the pull-toys were out en masse the children were well organized in a parade, quiet and happy as they marched up and down the ward. However, the combined quacks, tinkles and clangs were too much for the nurse, even though the babies slept through it all.

3. Toys should be such that they can be readily sterilized. Several times in this study toys were used by children with infectious diseases and these toys needed to be sterilized before they were passed on to other children. In this connection toys that can be boiled are the most desirable, although

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few fall in this category. Sterilization is also possible by scrubbing with soap and water, and soaking in alcohol, a procedure which usually relieves wooden toys of any color they might have had. In some hospitals exposure of equipment to fresh air and sunlight for 24 hours is considered adequate for safety.

4. In this study it was noted that the toys that appeared most appealing to the children were those simple in design and without extraneous detail. These toys seemed to allow the child more opportunity to fit them into their own play, for the child supplied the details. Blocks, balloons, furniture, ships, and the family of dolls could be used by all the children in many kinds of play situations. This was not true of the more highly structured toys: the toys that "do" something,—the mechanical type toy—although they also have a place in exercise and in watching even when the child cannot participate. It was the more versatile toy that was used most, by more different age groups, and for the longest periods of time.

5. Color of the toys, in itself, appeared to be a strong invitation to interest, especially in the younger children. For the older children, the unpainted set of blocks, train tracks, and train was one of the most popular toys.

Relating to Management of Toys in a Hospital

1. One question that emerges from the study is the problem of who should administer toys and guide the recreation of the children. Some hospitals employ occupational therapists, while others rely on volunteer workers. Few hospitals make play an integral part of the child's day under the direction of the staff, and few seriously consider play activities in the training program of pediatricians, nurses and attendants.

The advantages of having play supervised and guided by people who have daily contact with the children are many. For one thing, the nurse or physician can come to a better understanding of the child as a total human being capable of fears, laughter and imagination. In this study this was illustrated vividly by the use the children made of the play nurse and doctor sets.

For another thing, the indisposition of the child is not always a reliable index of the seriousness of his illness, and his needs for rest and inactivity. In this study an untutored person might have been deceived by the apparent vitality of the children with tuberculosis, and so allowed them more physical activity than would have been commensurate with their treatment. A nurse, understanding the child's disease and prognosis, might be able to help guide the child's interests toward more sedentary play,—toward quiet creative play,—as she knows that he probably will be restricted in activity during the rest of his childhood.

It might also prove to be less time-consuming for the nurse to distribute toys and supervise play than for her to try to discipline a ward full of

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children without play material. A child busy with a toy is not one likely to be engaged in mischief.

From the child's point of view it is perhaps more consistent and comforting to have his happier experiences connected with the nurse who must also be responsible for painful needles, and with people he knows and sees every day, than to have the disjointed experience of a person unknown to him and otherwise unconnected with the hospital present him with toys to play with two or three times a week. This is important when the child is hospitalized over a long period,—a year or more,—for then the inevitable transfer of emotion to the hospital staff is facilitated in a more natural way. Experiences with toys in the company of a nurse can also help the newcomer to the hospital, who after having a happy play experience with the nurse, might be more ready to cooperate in the necessary hospital routine.

Toys could become an integral part of a ward's equipment and a child's day. Nursing techniques might be developed using toys that help the ill child better to accept necessary treatment. A crude example of this would be to allow the child to do to a doll what the doctor has done to her, such as giving it an injection, putting a cast on a doll's leg, anesthetizing a doll with a paper cone, etc. Another possibility would be to use toys that would allow the child some part in his treatment. In this study toys were not used in this way. These are areas in which further research might reveal fruitful results.

2. Space on the ward for the storage of toys and some plan for their care are important considerations. From general impressions gained in this study it seems that it is better if toys are on the ward and available to the children instead of being kept in a central storeroom and distributed only for short play periods. When thus available, the child has the opportunity, when free, to pick and use the toy he most wants. The only ward in the present study that made space for the storage of toys was the ear, nose and throat ward. First the toys were kept on two shelves in the linen room. Since children were not allowed in this room, the toys were moved to a closet where supplies had been kept. The disadvantage of this second storage place for toys was that it was not directly on the ward but in an adjoining hall and had to be kept locked. The nurse found that she could delegate the key to a responsible, perhaps older child to obtain toys when a request was made and she was too busy at the moment to go to the closet. A more satisfactory arrangement would have been the storing of the toys on the bottom shelf of the cabinet in the ward itself, or in a separate cabinet for toys, to be kept in this room. In this way the children, in moments when they might otherwise have become bored, sad or boisterous, would have been able to fill their time with self-chosen, happier activities.

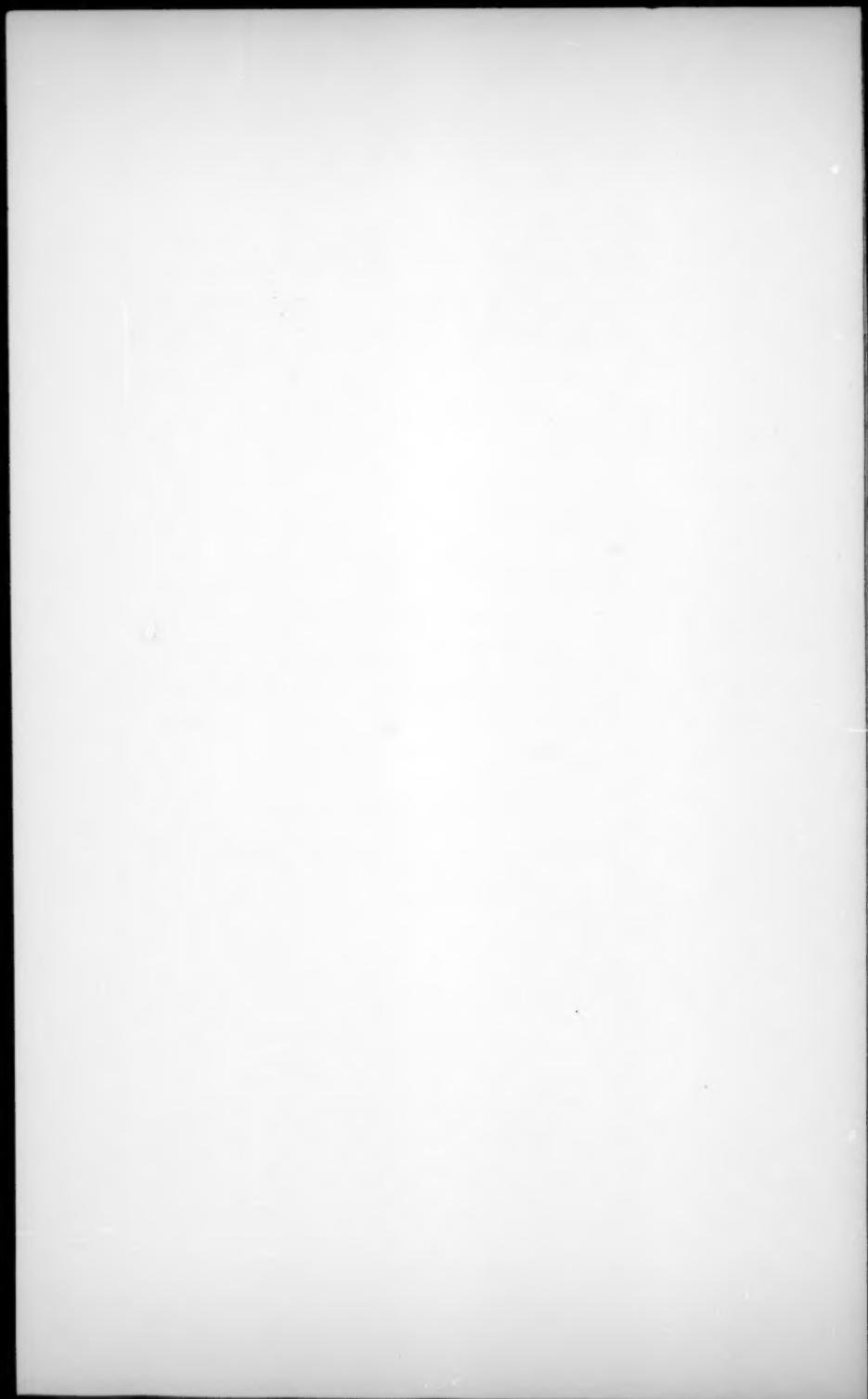
3. One aspect of the use of toys that has not been explored but which, judging from passing observations in this study, might be a rewarding field for research is the use of group play situations as teaching and therapeutic aids to the recovery and adjustment of ill children. The way the children

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spontaneously gathered in groups to play with the nurse and doctor sets, and the building equipment, gives a clue to the way group play may be used.

General Concluding Comments

1. The span of interest developed by children in this study seemed especially long, particularly when it is remembered that the children did not all feel well. This probably is due to the inability, in many instances, of the child to run from one toy to another, as in a nursery school. Frequently a toy was given a child and he, isolated in bed, had the choice of either playing with it or remaining idle.
2. Possible relationships between attitude and recovery from illness is suggested by this study. There is no research known to the author that deals with such a possible correlation. If it is true that those children who are happy, who can be content even while ill and in the hospital, have greater resistance to secondary infectious complications, and whose wounds healed more promptly, toys and play might have a significant place in the life of the hospitalized child from a medical approach.
3. It is natural for children to play, and by making the hospital as natural for children as we can, we might facilitate their adjustment and decrease the trauma of separation from what is familiar to them.
4. This report of an observational study is preliminary in many ways, but it is hoped that it will be stimulating to further research and thinking about the use of toys in helping children to have experiences in hospitals which are happier, and less traumatic.



THE ACETYLCHOLINESTERASE ACTIVITY OF ERYTHROCYTES OF GROWING CHILDREN

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During an investigation of the distribution and relative activity of various enzymes in the blood of growing children, a study of the activity of ChE in the red blood cells was conducted. The object of the survey was to determine the range of activity, the mean values for the sexes, and its possible relationship to other hematological data and to certain psychometric measurements. In order to conduct these analyses on the small amounts of blood obtained by finger puncture, a micro modification of the titrimetric method for determining this enzyme was developed.

The controversy (1, 9), regarding the nature of the enzymes occurring in the plasma and red cells which hydrolyze acetylcholine, will not be dealt with here. The pertinent arguments regarding nomenclature of these enzymes are resolved in an article by Glick (7). Suffice to say, that the enzyme occurring in plasma hydrolyzes many esters of organic acids in addition to acetylcholine, while the enzyme found in the erythrocytes hydrolyzes other esters; it splits acetylcholine at a higher rate than other substrates (11). For this reason, the ChE in the red cells may be regarded as very similar, if not identical with, that found in nerve tissue.

Previous work by Sabine (14), Cline (5), Sawitsky (15), Richter and Croft (13), and Alles and Hawes (1) have indicated the high ChE activity of human erythrocytes. Sabine (14) reported that the ChE activity of erythrocytes was higher than that of plasma in health and disease. Sawitsky (15) showed that the erythrocyte ChE was relatively constant in a given individual, but varied widely from individual to individual. Similar findings have been published for serum ChE by Hall and Lucas (8); a report of Mutru and Glasson (10) concludes that both serum and erythrocyte ChE activity "seems to represent a constitutional character." The reports (10, 12) dealing with the variation of blood ChE activity in various psychiatric syndromes are conflicting.

METHOD

The blood, which was collected by finger puncture, was prevented from coagulating by a trace of sodium heparinate and analyzed within two hours of the time of collection. A 50 cmm. (0.05 ml.) sample of blood was

¹ The authors are indebted to Dr. Virginia Nelson, who provided them with the Revised Stanford-Binet intelligence scores, and to Dr. L. W. Sontag for encouraging these researches.

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mixed with 2 ml. of 0.9% saline solution, centrifuged and the supernatant discarded. The cells were then laked with 3 ml. of redistilled water, and analysis for ChE activity was conducted immediately.

The ChE activity was determined by titrating, with 0.001 N sodium hydroxide, the release of acetic acid from a 0.016 M solution of acetylcholine bromide (E. K. Co.) maintained at pH 7.40 ± 0.01 , at 37°C in the presence of the activation ions reported by Nachmansohn (11). The titration (Beckman model G, pH meter) continued for 20 minutes, and the average value for a 5-minute period was taken as one unit. Thus, 10 ml. of 0.04 M acetylcholine bromide were mixed with 4 ml. of Nachmansohn's buffer (bicarbonate omitted), and the 3 ml. solution of laked cells was added, along with 3 ml. of redistilled water rinsings from the tube which contained the cells. A blank value, due to spontaneous hydrolysis of acetylcholine, was obtained daily and subtracted from the titration value obtained in the presence of the enzyme.

The cell volumes (16) and red cell counts (2) were determined photoelectrically on an instrument calibrated here. Hemoglobin was measured by the method of Evelyn (6).

TABLE I
NORMATIVE DATA FOR ERYTHROCYTE ChE ACTIVITY

	MALE	FEMALE	TOTAL
Age Range (months)	104-202	82-205	82-205
Mean Age (months)	149.4	139.6	144.1
Number	18	21	39
Mean Hemoglobin (gms./100 ml.)	15.4	14.9	15.1
Mean Red Cell Count (millions)	5.14	4.94	5.03
Mean Cell Volume (%)	44.4	42.5	43.4
ChE ACTIVITY			
<i>Per Volume of Blood</i> (units/100 cmm. blood)			
Mean	1.74	1.75	1.75
Standard Deviation	0.20	0.37	0.31
<i>Per Erythrocyte</i> (units $\times 10^7$)			
Mean	3.43	3.53	3.48
Standard Deviation	0.45	0.73	0.62
<i>Per Volume of Red Cells</i> (units/100 cmm. rbc.)			
Mean	3.98	4.10	4.04
Standard Deviation	0.56	0.79	0.72

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RESULTS AND DISCUSSION

The analytical findings are shown in Table I, along with pertinent hematological data. It can be seen that there is no significant difference between the sexes when the enzyme activity is expressed as a function of whole blood, total red cell volume, or of erythrocyte count. The coefficient of variation ($S.D./M$) of 18%, regardless of the method of expressing the enzyme activity, indicates a rather wide range of values for the individuals studied. The greater variability of the data from females may indicate that the ChE activity fluctuates with the menstrual cycle. There was no significant age difference ($P = 0.3$) in ChE activity as determined by comparing the data obtained from the 12 oldest and 12 youngest subjects.

TABLE II
COMPARISON OF FELS AND SAWITSKY NORMS

	FELS		SAWITSKY*	
	Mean	S.D.	Mean	S.D.
ChE Units / 100 cmm. RBC.				
Male	3.98	0.56	4.52	0.46
Female	4.10	0.79	4.18	0.35
TOTAL	4.04	0.72	4.39	0.39
ChE Units $\times 10^7$ / RBC.				
Male	3.43	0.45	3.85	0.33
Female	3.53	0.73	3.63	0.22
TOTAL	3.48	0.62	3.76	0.33

* The data of Sawitsky were converted to Fels units for the purpose of this comparison. The calculation, involving correction for differences in the normality of the alkali, time, and sample size, was: Sawitsky units per ml. of red cells $\div 2$ = Fels units per 100 cmm. of red cells. The standard deviation scores for Sawitsky's data were calculated from his published raw data.

Table II compares the data of Sawitsky (15) obtained from adults and that reported here on children. Considering the differences in methodological detail, the agreement found can be considered satisfactory. The smaller coefficient of variation found by Sawitsky probably indicates that the macro procedure he used was more precise than our micro procedure, rather than indicating less variability in adults than in children. He also found no significant sex difference in erythrocyte ChE activity.

The little data we have regarding the daily variation of an individual adult female [$(S.D./M) = 11\%$, $N = 6$] indicate that the red cell cholinesterase activity may be regarded as characteristic for an individual

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in confirmation of the reports of Sawitsky (15) and Mutrux and Glasson (16).

Analysis of other data obtained on the same blood samples revealed that there was no relation between cholinesterase activity and that of other hydrolytic enzymes such as red cell arginase (3) and plasma alkaline phosphatase (4), nor with other blood measurements such as hemoglobin, white cell count, and sedimentation rate.

In view of the fact that cholinesterase is intimately involved in the biochemical mechanism of nerve transmission, and, presumably for this reason, has been studied in connection with various mental disorders, its activity was evaluated in terms of the intelligence scores of the children. The subjects having the highest ChE activity had a mean Revised Stanford-Binet IQ of 127.4, while the 10 lowest had a mean IQ of 117.9. The difference, however, was not significant ($0.1 < P < 0.2$).

SUMMARY

Erythrocyte acetylcholinesterase activity, analyzed by a micro procedure, was determined on blood samples from 21 girls and 18 boys between the ages of 7 and 17 years. There was no significant age or sex difference, but a greater variability among the girls. No correlation was found between these data and certain hematological and psychometric measurements. Unexplained differences between individuals exist with respect to the activity of this enzyme in the red cells.

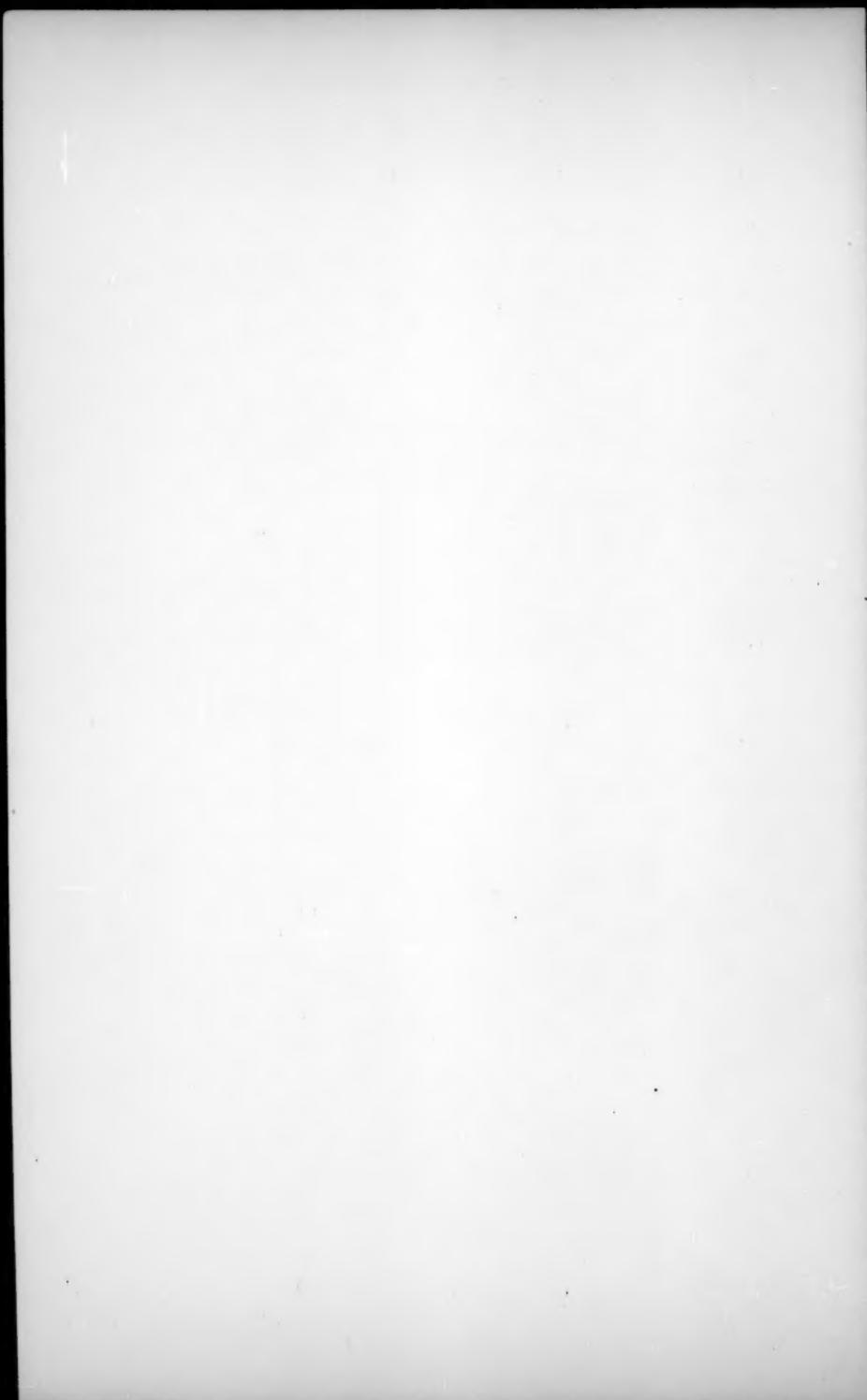
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CHILDREN'S ETHNIC ATTITUDES: II. RELATIONSHIP TO PARENTAL BELIEFS CONCERNING CHILD TRAINING¹

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A number of studies³ have shown a positive and appreciable correlation between attitudes of children and of their parents in various attitude areas. Correlations range from about +.20 to about +.80, with characteristic values in the range +.40 to +.55. Many of these studies imply that the attitudes maintained by parents provide learning situations wherein children develop attitudes of their own which resemble the points of view expressed by the parents. It might be argued that the personality patterns of parents produce a kind of pervasive family atmosphere, within which children develop similar personality structures, including particular attitudes, biases, and beliefs. Attitude patterns of adults have been shown to be congruent with certain broad personality characteristics which are more extensive than the particular attitudes in question. There is now accumulating evidence that attitudes in children likewise tend to be associated with broader personality characteristics. The work of Frenkel-Brunswik (1, 2) and a previous paper by the present writers (3) illustrate this point.

Since the prejudiced personality, at least in the anti-Semitic and anti-Negro areas, seems to be rather rigid and authoritarian, it occurred to the present writers that these aspects of personality might likewise appear in the attitudes toward children expressed by adults and even in the child-rearing practices preferred by them. The present study was aimed to explore, at least in a preliminary fashion, such possible relationships.

In another paper (3) the writers have described the development of an eighteen-item attitude scale toward Negroes for young children. They have shown how the attitude identified by this scale appears to relate to certain personality characteristics of children in the intermediate grades.

The present study is predicated on the assumption usually made in research on children that patterns of family experience can be identified in

¹ This is one of a series of studies on the broad problem of social responsibility being conducted in the Laboratory for Research in Social Relations, University of Minnesota, under a grant from the Carnegie Corporation.

² A member of the Minnesota Laboratory at the time of the research.

³ Examples are: Woodward, L. E. Relations of religious training and life patterns to the adult religious life. *Teach. Coll. Contr. Educ.*, 1932, No. 527; Newcomb, T. E. and Svehla, G. Intrafamily relationships in attitude. *Sociometry*, 1937, 1, 180-205.

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parent-child interactions, especially in the areas of discipline and control, and probably also in areas of affectional relationships, such as accepting, ambivalent, or rejecting behaviors. An additional assumption is made—that parental handling, especially in control and affectional relationships with children, has definite repercussions in the child's personality structure. These repercussions develop not so much directly as indirectly, through the child's system of organic and social "needs." More specifically for this study, the writers were interested in the hypothesis that authoritarian and disciplinary attitudes of parents concerning child training practices would be related to a greater incidence of ethnic bias in the children of these parents.

THE MEASURING INSTRUMENT

The writers constructed a questionnaire relating to opinions and practices concerned with child rearing. This measure drew in part on the material published by Radke (4) and by Shoben (5), and on unpublished material in the files of the Institute of Child Welfare, the University of Minnesota. The final scale consisted of three parts. In Part I, 36 items concerned with attitudes toward children and child handling were to be answered on a true-false basis. Part II included 35 items, each of which was a statement describing a child-handling practice. The parent was expected to indicate the degree of his practice by selecting one of three response categories—"very much," "somewhat," "very little,"—or, "usually," "sometimes," "rarely." Part III presented ten common behavior problem situations described at some length, each followed by five or six techniques that parents might use in handling the problem. Parents were asked to mark all those alternatives they would consider taking and to reject all those they would not consider taking. The items making up these sections were selected primarily because they had proved in previous researches to be unambiguous and discriminating, and also because each item appeared to the writers to relate in some fashion to one of several dimensions of family relationships—authoritarian practice, permissiveness, emotional distance between parent and child, and general good judgment in rearing children.

PROCEDURE

The parent questionnaire was mailed to the mothers of 240 children on whom attitude test data were available. Fourth, fifth, and sixth grades of two schools were involved. One school was in a distinctly lower middle-class area; the other school in a heterogeneous area occupied by professional people, a few entrepreneurs, and a number of skilled and semi-skilled workers. Unskilled labor was unrepresented in both schools.

Questionnaires were mailed to mothers of children together with a letter stating that a study of parent attitudes toward child handling was being conducted in the city and that these mothers had been selected as a

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sample representing their area. If they were interested in obtaining a summary of results of this poll on child rearing, they were asked to mail separately an enclosed post card giving their return address. Questionnaires were secretly coded in order to secure identification. With one follow-up letter, a 72 per cent return was obtained in School A and a 54 per cent return from School B. The occupational distribution of persons returning the questionnaire was not available in all cases, but it would appear from cases on which such data were available from the school files, that there was a slightly disproportionate return from the higher groups.

Whether or not a questionnaire was returned was not, however, related to the average prejudice expressed by the children in the tests given them prior to the circulation of the questionnaire. Table I presents this comparison. In School A no difference exists between means or between standard deviations of attitude test scores of children whose mothers returned the questionnaire and those whose mothers did not return the questionnaires. In School B no difference exists in means, but a significant difference does exist in standard deviations, the children whose mothers failed to return the questionnaire being more homogeneous with respect to the distribution of their attitude scores. The following analyses are based on the distributions of attitude scores of the children whose mothers returned the questionnaire.

TABLE I
COMPARISON OF CHILDREN WHOSE MOTHERS RETURNED QUESTIONNAIRES AND THOSE WHOSE MOTHERS DID NOT

	N	Attitude Test Scores of Children	
		Mean	S.D.
<i>School A</i>			
Mothers returning questionnaire	100	14.3	3.2
Mothers not returning questionnaire	37	14.5	3.3
<i>School B</i>			
Mothers returning questionnaire	54	13.5	4.5
Mothers not returning questionnaire	46	13.7	2.8

RESULTS

In School A the questionnaires returned by mothers of the 25 children who scored highest on the child's 18-item attitude scale were designated as one criterion subsample, and the 25 questionnaires of mothers whose children fell in the lowest ranges of the child's attitude test scores were segregated as the second criterion subsample for further study. In School B deviate quarters contained only thirteen cases each, too small for the item

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analysis proposed; therefore, these cases were combined with School A to form 38 cases in the high and low scoring groups, and a separate item analysis was run for this enlarged *N*. The attitudes of the mothers on each item of the parent questionnaire were tabulated separately for these groups, and the significance of the difference in the proportions answering was obtained. Phi values were computed for all items. Table II gives those items which approach statistical significance. Following each item is an answer in parentheses which indicates the direction favored by the mothers of *prejudiced* children.

Inspection of these items indicates that the mothers of prejudiced children characteristically expect obedience promptly and unquestioningly from children. The parents of unprejudiced children are less in favor of spanking children or of disciplining them by shaming.

Mothers of prejudiced children as contrasted with mothers of unprejudiced children show authoritarian attitudes in such statements as: "Obedience is the most important thing a child can learn." "It is wicked for chil-

TABLE II

**ITEM ANALYSIS OF PARENT QUESTIONNAIRES: ITEMS DISCRIMINATING
BETWEEN ATTITUDES OF MOTHERS OF PREJUDICED CHILDREN
AND ATTITUDES OF MOTHERS OF NON-
PREJUDICED CHILDREN**

Item	School A			Schools A & B Combined		
	Phi	C.R.	P.	Phi	C.R.	P.
<i>Part I</i> (Note: Answer given is that selected by mothers of prejudiced children.)						
A child should never be permitted to set his will against that of his parents. (true) ....	.338	2.39	.02	.200	1.74	.08
A child of school age should be made to take care of his own room, make his own bed, and the like. (false) .....	.260	1.84	.07	.238	2.07	.04
A child should never keep a secret from his parents. (true) .....	.343	2.43	.01	.218	1.90	.06
Obedience is the most important thing a child can learn. (true) .....	.327	2.31	.02	.303	2.64	.01
It is wicked for children to disobey their parents. (true) .....	.228	1.61	.11	.250	2.18	.03
A child ought to be whipped at once for any sassy remark. (true) .....	.100	.71	.48	.228	1.99	.05
Every mother just naturally feels deep and true love for her children. (true)245	1.73	.08	.163	1.42	.15

(table continued on next page)

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TABLE II (*continued*)

Item	School A			Schools A & B Combined		
	Phi	C.R.	P.	Phi	C.R.	P.
<i>Part II</i> (Note: The mothers of the criterion group indicated select the response given in parentheses more frequently than the mothers of the other criterion group.)						
If my child does not want to do what I ask, I give in to him. (prejudiced = rarely) ...	.296	2.09	.04	.160	1.39	.16
I discipline my child by spanking him. (non-prejudiced = rarely) .....	.203	1.43	.15	.211	1.84	.07
I discipline my child by shaming him. (prejudiced = usually) .....	.143	1.01	.31	.204	1.78	.07
I offer my child rewards to get him to obey me. (prejudiced = usually) .....	.204	1.44	.15	.204	1.78	.07
When he doesn't get his own way, my child ignores me and does as he pleases anyway. (prejudiced = usually) .....	.143	1.01	.31	.204	1.78	.07
My child gets his own way. (prejudiced = usually) .....	.200	1.41	.16	.241	2.10	.03
I prefer a quiet child to one who is noisy. (prejudiced = somewhat, and very much) .....	.281	1.99	.05	.304	2.65	.01
I prefer a quiet child to a "chatterbox." (prejudiced = very much) .....	.143	1.01	.31	.241	2.10	.03
I prefer a bold daring child to a cautious child. (prejudiced = very little) .....	.240	1.70	.09	.160	1.39	.16
<i>Part III</i> (Note: The mothers of the criterion group indicated select the response recorded here in the greater proportion.)						
Bedtime problem—refusal to go to bed: (prejudiced) Do not insist on a regular bedtime. ....	.288	2.04	.04	.270	2.35	.02
Sex play problem (masturbation): (prejudiced) Punish her. ....	.253	1.79	.07	.184	1.60	.11
(prejudiced) Take her to a doctor. ....	.204	1.44	.15	.204	1.78	.07
(non-prejudiced) Just ignore it. ....	.246	1.74	.08	.150	1.32	.19
Temper-tantrum: (prejudiced) Teach her that two can play that game by getting angry yourself.333	2.35	.02	.179	1.56	.12

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dren to disobey their parents." Yet mothers of prejudiced children are possibly less effective in their attempts at control, for they admit in greater numbers that when their children do not get their own way, the children usually ignore the mothers and do as they please anyway. (These mothers also say that their children usually *do* get their own way!) The mothers of prejudiced children are more willing to forego a regular bedtime, they are less likely to insist on a child's caring for his own room, making his bed, and the like. They prefer quiet and cautious children to more noisy and daring ones. Mothers of prejudiced children say they are likely to offer rewards to get the child to obey. Although these findings are not conclusive, they do suggest that the training patterns preferred by the mothers of highly prejudiced children are in contrast with those preferred by the parents of non-prejudiced children. Furthermore, these differences are in the direction of greater authoritarianism on the part of the parents of prejudiced children.

The items listed in Table II were taken to constitute an *empirical scale*, a high score on which would reflect the pattern of child-rearing practices and opinions typically held by mothers of markedly prejudiced children.

The second major analysis of this study relates to certain scoring categories developed for the parent questionnaire. The writers, having discussed the general content of the questionnaire from the standpoint of the dimensions included, independently assigned the items to five *a priori* scales in addition to the empirical scale just described. No item was included in any one of the five scales unless there was independent agreement on its location by all three judges, but an item could appear in more than one scale.

(1) Authoritarian attitudes and practices, sample items of which follow, together with the answers presumably indicative of the dimension.

A child should learn to keep quiet when there are adults around.
(True)

Children need some of their natural meanness taken out of them.
(True)

A child should never be permitted to set his will against that of his parents. (True)

I am strict and firm with my child. (Usually)

I enforce the rule a child should be seen and not heard. (Usually)

I discipline my child by spanking him. (Usually)

To an eating problem described briefly, this response: "Susie should be made to leave the table unless she gives some attention to her own food."

To a sex play problem, these responses: "Punish her," and "Tell her it isn't nice."

To a temper tantrum, these responses: "Punish her," and "Teach her that two can play that game by getting angry yourself."

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(2) Permissiveness, the tendency of the parent to be quite lenient and "broad-minded" in handling children, giving them considerable latitude. Examples of this scale are as follows:

Children should have lots of babying when they are small. (True)
Mild discipline is best. (True)
I am strict and firm with my child. (Rarely)
My child is expected to be neat and tidy in the house. (Very little)
I expect unquestioning obedience from my child. (Rarely)
To a problem situation concerning a child who cannot make his allowance stretch, the response: "Increase his allowance."
To a sex play problem, the response: "Just ignore him."
To a temper tantrum at nap time, the response: "Let her skip the afternoon nap."

(3) Parent-child integration, or evidence of a close, effective emotional relationship between parent and child.

I play with my child very much. (True)
My child is easy to manage. (Usually)
I am strict and firm with my child. (Sometimes)
My child shows affection for his father. (Very much)
My child shows affection for his mother. (Very much)
My child resents the discipline I give him. (Very little)
To a school failure problem, the response: "Help her with her lessons if she can't do them alone."
To the allowance problem, the response: "Help him budget his present allowance. Sit down with David and list what can be considered reasonable expenses and compare those with his allowance and make a fair adjustment."

(4) Parental rigidity or "fussiness"—unwillingness to put up with children's noise, antics, disruption, etc.

The child should learn to keep quiet when there are adults around. (True)
Children should be allowed to do pretty much what they wish. (False)
Most children are much too smarty nowadays. (True)
A child who is not polite and mannerly with adults has been brought up poorly. (True)
My child is expected to be neat and tidy in the house. (Very much)
I prefer a quiet child to a chatterbox. (Very much)
I prefer a bold, daring child to a cautious child. (Very little)
To the eating problem, the response: "Child should be made to leave the table unless she gives some attention to her food."
To the sex play problem: "Tell her it isn't nice."
To a sibling rivalry and quarreling problem, the response: "The two boys should be told never to fight and whipped if they disobey."

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(5) General good judgment scale, which represents the agreement of the writers on the response which would be indicated by "best practice" in modern child rearing, on which "experts" would probably agree.

(6) The empirical scale, based on the items actually found to differentiate between the mothers of prejudiced and the mothers of unprejudiced children as described above.

Thus, a high score on a particular *a priori* scale represents "more" of the characteristic designated by its title. A high score on the empirical

TABLE III
OBTAINED CORRELATIONS BETWEEN *a priori* SCALES OF
PARENT QUESTIONNAIRE
(Figures in Parentheses indicate number of items common to both keys)

	No. of Items	SCHOOL A (N = 92)				
		2	3	4	5	6
1. Authoritarian	42	—.263* (5)	—.140 (1)	.844† (10)	—.830† (26)	.736† (10)
2. Permissiveness	17		.170 (2)	—.188 (3)	.264* (8)	—.263* (4)
3. Parent-Child Integration	16			—.070 (1)	.367† (9)	—.071 (0)
4. Parental Rigidity	23				—.694† (11)	.742† (5)
5. "Good Judgment"	65					—.692† (12)
6. Empirical	21					

		SCHOOL B (N = 52)				
		2	3	4	5	6
1. Authoritarian		—.276*	.005	.878†	—.850†	.830†
2. Permissiveness			.302*	—.310*	.427†	—.239
3. Parent-Child Integration				—.050	.232	—.005
4. Parental Rigidity					—.856†	.796†
5. "Good Judgment"						—.759†
6. Empirical						

* Significant at .05 level

† Significant at .01 level

scale represents the attitudes and practices reported more frequently by mothers of prejudiced children.

Table III indicates the number of items in each of these *a priori* scales and the obtained correlation between them. The items common to these several scales, though scored differently, introduce a certain amount of spurious correlation, which if removed, would lower most of the values presented. The largest relationships, however, would probably still be significantly larger than zero. The authoritarian scale is positively and substantially related to the rigidity or "fussiness" scale and to the empirical scale. The authoritarian scale is negatively and substantially correlated with the "good judgment" scale. Good judgment, in turn, is substantially negatively correlated with the empirical scale; that is, opinions in agreement with "expert opinion" on child rearing are inversely related to opinions and practices reported more frequently by mothers whose children were exceptionally prejudiced. The authoritarian attitude and the "fussiness" dimension are unrelated to either permissiveness or parent-child integration. The permissiveness, parent-child integration, and empirical scales are mutually uncorrelated. It is possible that the permissiveness and parent-child integration scales are too brief to be well determined as dimensions. Theoretically one would assume that the permissiveness scale would correlate negatively with the authoritarian scale and also with the empirical scale. The good judgment dimension does not appear to correlate with permissiveness or with parent-child integration, although again one might expect a positive relationship, in terms of modern theories of child rearing.

Distributions of the scores of parents of the most and least prejudiced children on each of the six scales were also made. The overlap of the highs and lows on each scale was considerable, with the exception of the empirical scale where the proportion of correct identification achieved by cutting at the mean would be 70.⁴ However, in spite of the substantial overlap, some relationship between the high-low dichotomy on children's prejudice and scores on the various scales was observed. If, for each scale (both schools combined), the optimum cutting score is established (to create as little overlap as possible between highs and lows) and the sortings obtained included in a 2×2 table, the distributions given in Table IV appear.

All of the differences in Table IV are in the expected direction, and all except one approach statistical significance. Thus it would seem that although the magnitude of the relationship is not large, there is a tendency for more of the mothers of prejudiced children (as contrasted with mothers of non-prejudiced children) to score in the higher ranges of the authoritarian and the rigidity scales. Correspondingly, fewer of the mothers of low-prejudiced children scored low on permissiveness, parent-child integration, and good judgment.

⁴ This separation is, of course, spuriously high, as it was obtained on the same groups whose responses were used for selecting the items.

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It is possible to correlate scores made by mothers on the several scales of the parent questionnaire with the scores achieved by their children on the attitude and personality scales described in the writers' preceding paper (3). For this analysis, two scales were selected—the eighteen-item scale relating to Negro prejudice and the one composed of fourteen items relating to personality characteristics of prejudiced children. The correla-

TABLE IV

RELATIONSHIP OF SCORES ON THE PARENT QUESTIONNAIRE SCALES TO THE HIGH-LOW DICHOTOMY ON CHILDREN'S ATTITUDES

(L and H signify the criterion groups of mothers of children with "low" or "high" prejudice. The symbol K designates that cutting score on the particular *a priori* scale named which minimizes overlap.)

Authoritarian Scale		Permissiveness Scale		Integration Scale	
L	H	L	H	L	H
>K	20	27	>K	23	19
<K	18	11	<K	15	19
$\chi^2 = 2.73$		$\chi^2 = 0.85$		$\chi^2 = 2.62$	
.05 < P < .10		.30 < P < .50		.10 < P < .20	
Rigidity Scale		Good Judgment Scale		Empirical Scale	
L	H	L	H	L	H
>K	17	24	>K	26	18
<K	21	14	<K	12	20
$\chi^2 = 2.60$		$\chi^2 = 3.45$		$\chi^2 = 11.85$	
.10 < P < .20		.05 < P < .10		P < .01	

tion values appear in Table V. Correlations are not large, though usually they are in the expected direction. It is, of course, recognized that the correlation of the empirical scale in the parent questionnaire with the Negro attitude scale is spuriously high in that the latter scale was used indirectly as a criterion for the derivation of the former.

DISCUSSION

To the extent that these *a priori* keys have face validity and are reliably determined, the hypothesis advanced earlier in this paper is at least partially substantiated. Certain derivative hypotheses—that a close relationship

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between parent and child and permissiveness of the parent foster a liberal, open-minded attitude in children are not substantiated, but this may be due as much to inadequate determination of these attitudes as to lack of a real relationship in these areas.

A further comparison was made by separating the highest and lowest fourths of mothers on each *a priori* scale as scored, segregating their children's prejudice scores, and computing the significance of difference be-

TABLE V

CORRELATIONS BETWEEN *a priori* SCALES OF PARENT QUESTIONNAIRE
WITH MEASURES OF CHILDREN'S PREJUDICE

Parent Attitudes	Children's Prejudice Scores on Negro Attitude Scale [‡]		Children's "Intolerant Personality" Scale	
	School A	School B	School A	School B
Authoritarianism	+.286†	+.015	+.145	+.120
Permissiveness	+.037	-.219	+.070	-.024
Parent-Child Integration ...	-.019	-.201	-.081	-.159
Rigidity	+.120	+.112	+.224*	+.003
"Good Judgment"	-.246*	-.015	-.230*	-.126
Empirical	+.420†	+.119	+.306†	+.277*

* Significant at .05 level.

† Significant at .01 level.

‡ Since a numerically high score in the original scoring of the children's tests indicated the *absence* of prejudice, the signs of correlation coefficients have here been reflected, so that the "direction" of the relationship agrees with that in the "Intolerant Personality" scale.

tween the two distributions of children's prejudice scores. Table VI presents these results. Here the difference in attitude between the children of "high" and "low" mothers on the general good judgment scale is reflected in a "t" value which is significant at the one per cent level. The authoritarian and integration scales reach the 13 per cent level, whereas the permissiveness and fussiness keys yield no significant difference.

In reviewing the results that have here been detailed, one is impressed with the fact that the negative and less "desirable" aspects of the picture seem to be somewhat better determined. The authoritarian and rigidity or "fussiness" complexes show a higher degree of interrelationship than do parent-child integration and permissiveness attitudes. It is perhaps significant that it was more difficult to locate items which would make satisfactory appraisal of these latter dimensions. The writers are willing to suggest that even though a satisfactory number of items was obtained, the resulting correlation would not be so high as the correlations found be-

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tween the less socially acceptable attitudes. This phenomenon appears to be an incidental illustration of the fact that less socially acceptable or negative statements in personality or attitude tests make sharper discriminations than do more positively stated or desirable aspects of personality. An alternative possibility is that certain kinds of personalities are prejudiced and many other kinds essentially unprejudiced. Items which would

TABLE VI
COMPARISON OF MEAN ANTI-NEGRO ATTITUDE SCORES OF CHILDREN OF
"HIGH" AND "LOW" MOTHERS—CRITERION GROUPS OF MOTHERS
BEING CHOSEN ON THE BASIS OF SIX SCALES
OF PARENT QUESTIONNAIRE
(N = 38 in each group.)

Criterion	Mean	S.D.	Mean	S.D.	C.R.	P.
Authoritarianism	13.26	4.09	14.58	3.17	1.56	.13
Permissiveness	13.74	3.66	13.11	3.81	.73	..
Parent-Child Integration ...	14.68	3.37	13.39	3.77	1.57	.13
Rigidity	13.42	3.57	14.05	3.76	.63	..
Good Judgment	14.89	2.99	12.87	3.88	2.54	.01
Empirical	12.66	3.55	15.37	2.64	3.73	<.01

be selected by these latter types do not appear in large numbers in any analysis because the relevant variables are randomly distributed over the population of non-prejudiced persons.

Probably the fact that the permissiveness and parent-child integration scales are very brief accounts in part for the low intercorrelation of these scales and their low relationship to other scales. It is possible, however, that the manner in which they were constructed—inspectionally—resulted in too heterogeneous content. Parental "fussiness" or rigidity seems to be clearly associated with the authoritarian attitude. "Good judgment" is inversely related to authoritarian attitude and to fussiness or irritability.

Prejudice in children appears to be associated with the complex of parental attitudes which is involved in authoritarian handling of control and with lack of tolerance of children's "annoyance-value." It appears that attitudes of tolerance and good judgment in child-rearing are, possibly, part of a personality and attitude complex on the parents' part which is associated with freedom from ethnic prejudice in children.

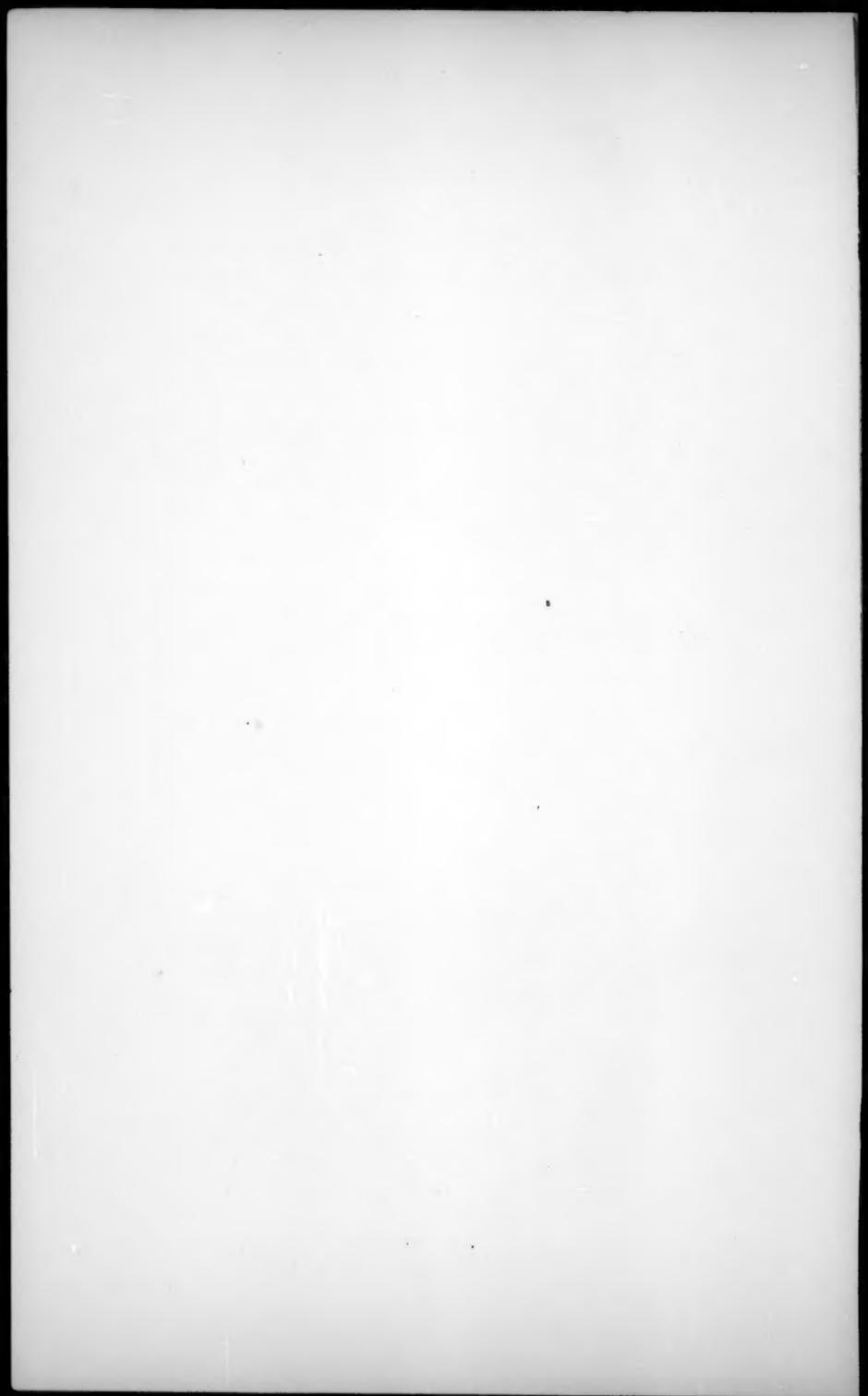
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This study may be viewed as furnishing further support to the argument that attitudes in children are not based on a simple one-to-one relationship with similar attitudes held by their elders. Specific attitudes toward the Negro as well as toward the Jew are part of a larger complex of attitudes and personality characteristics which reveal themselves in interpersonal relationships of various sorts—including parental attitudes toward children and preferred practices in child-rearing.

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A COMPARATIVE STUDY OF THE ASCENDANT BEHAVIOR OF NORTHERN AND SOUTHERN NURSERY SCHOOL CHILDREN¹

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THE PROBLEM

For some years now it has been the opinion of several child development specialists who have observed both northern and southern children in nursery schools and in their homes, that the former were more assertive, more active. Negro nurses in the South encourage the children they care for to be quiet and relatively inactive. They favor children who are little "ladies" and "gentlemen." There has been the feeling, too, that southern nursery school teachers also are inclined to like their children quiet and untrouble-some, and tend to encourage that type of behavior. Teachers who have just come south after experience in northern nursery schools are aware of a lack of combat among the southern children. They report that conflicts between northern children are more frequent and more violent. The southern children seem to have more socially acceptable techniques for getting along. They are more amenable and tend to adjust to children better. They are also more amenable to the suggestions of adults. In comparison, the northern children seem belligerently aggressive. In general, southerners are less competitive and thus southern parents probably set for their children a pattern of less competitiveness.

This study has been undertaken to determine whether these observed differences in assertiveness are borne out under more controlled conditions. Specifically, the purposes are as follows:

1. To measure the ascendancy of a group of three- and four-year-old southern children of similar socio-economic and intelligence background to those measured in Iowa City, and to compare their scores with the scores of the Iowa City children obtained in the previous study.
2. To determine the nature of any difference in ascendancy found between northern and southern children. Does it occur in the case of both boys and girls? Does it occur at all ages tested?

¹ The writer gratefully acknowledges her indebtedness to Jefferson Cobb, Research Assistant, who did the statistical work; and to Dr. Leon Festinger of the University of Michigan who advised as to the statistical analysis. Acknowledgment is also made to Margaret McPhaul, Supervisor of the University of Georgia Nursery School, who helped in establishing observer reliability, and to the teachers of the Nursery School who participated in the ratings.

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ORIENTATION WITH RELATED RESEARCH

For the purpose of orientation, research closely related to the present problem is briefly discussed. The group of studies most relevant to the thinking underlying this and the previous article by the author (7) is the series of investigations in the measurement and modification of ascendant behavior of young children initiated by Jack (4) and continued by Page (9), Hatherly (3), and Fairlie (1). The main contributions of these four studies would seem to be as follows: 1) the development of a reliable method of measuring the ascendant behavior of three- and four-year-old children in an experimental situation; and 2) the finding that by a rather simple training technique, some three- and four-year-old non-ascendant children can be trained in self-confidence with a resultant increase in the manifestations of ascendancy in the experimental situation. However, these four studies attempted no differentiation, on the basis of social acceptability, between the types of ascendancy manifested by individual children. By the Jack method, two children may receive identical ascendancy scores although one may use socially "mature" methods whereas the other may use socially "immature" methods. The fifth study, by the writer (7), therefore differentiated between the various specific behaviors making up a child's score, and gave each a social evaluation. Forty-one judges rated the specific behaviors on an eleven-point equal-appearing-interval scale extending from very unacceptable behaviors through a neutral point to behaviors which were socially very acceptable. Examples of these 78 specific behaviors observed in children are given in the previous article.² In addition to the Jack score, each child was given two scores weighted according to the acceptability of the methods he used. Following the lead of Jack, seven of the least ascendant children were then taught certain skills unfamiliar to the other children as a means of increasing their self-confidence. The resultant increases in ascendancy made by these children were then analyzed for qualitative differences. Until the present, all subjects have resided in the North. The application of the measure to children in the South would make it possible to determine whether there are any differences in ascendancy, possibly culturally determined, between northern and southern children.

DEFINITION OF ASCENDANCE

For this study, as for others by the writer, ascendancy has been defined as follows: Ascendant behavior is any kind of behavior by which an individual attains or maintains mastery of a social situation, or attempts to attain or maintain mastery so that he is in control of his own activities and can carry out his purposes. At the preschool ages, attempts at mastery of a situation include:

² Mummery (7), pp. 43-46.

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1. Attempts to secure materials he wants from his companions.
2. Attempts to direct or influence the behavior of companions.
3. Attempts to defend himself, his possessions and his activities, and to resist direction of companions.

Mastery includes:

4. Success in the above three types of attempts.

PLAN OF STUDY

In order to compare the ascendant behavior of northern and southern children, it was necessary first to do the following: 1) measure the ascendance of a group of Athens three- and four-year-old children of similar socio-economic and intelligence background to those measured in Iowa City in 1941-42, 2) establish the reliability of the new type of scores to be used for the comparison, 3) determine the effect of the companion's age on the child's score, 4) set up criteria for selecting northern and southern children from the total groups, and 5) determine whether there are sex differences which would necessitate analyzing data for boys and girls separately.

SUBJECTS

The Iowa City subjects were the 42 children enrolled in two separate groups of the University of Iowa Preschools, one being a morning group and the other an afternoon group. These groups were differentiated chiefly, but not wholly, on the basis of chronological age. The children ranged in age from 42 to 61 months with a mean age of 49.0 months and a mean IQ of 119.0.³ The distribution of the subjects among the seven divisions of the Minnesota Classification of Occupational Status prepared by Goodenough (2) showed that 71 per cent fell in the first two classifications as compared to 7.2 per cent in the general population. The Athens subjects were the three- and four-year-old children enrolled in the University of Georgia Nursery School during the school year 1947-48. Some of these children were from an all-day group and some were from a half-day group of veterans' children. The age range in each group was from two to four years inclusive. The two groups were thrown together for much of the nursery school day, notably for creative activities, outdoor play, and indoor play with wheel toys. Some children in the veterans group also stayed the full day.

The 33 Athens children initially tested ranged in age from 38 to 59 months with a mean of 49.2 months. The IQ's of the 17 children for whom test scores were available indicate that the group represented a definite selection upward in intelligence, the mean IQ being 122.6. Of this group 78 per cent fell in the first two divisions of the Minnesota Classification. The group thus represented a selection upward in socio-economic status as

³ Subjects were tested on Form L of the 1937 Stanford-Binet.

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well as intelligence, as approximated by the scores available, and was similar to the Iowa City group in these factors.

EXPERIMENTAL SITUATION AND PROCEDURE FOR THE MEASUREMENT OF ASCENDANCE

Ascendance scores were obtained by observing the behavior of the children in a controlled play situation, described in detail elsewhere (7), which consisted of a small box of sand containing three toys. Each child was paired with five other children drawn at random from his age group, a different toy set being used for each of the five pairings. No child participated in the ascendance experiment more than once in the same day. A high level of enthusiasm for the "games" was maintained throughout the experiment. The exact procedure observed for the Athens pairings was identical with that followed with the Iowa City children (7). The toys used with the Iowa City group are pictured in Figure 1 and their combinations are listed below:

- Toy Set I. Wooden train (engine and one car), beetle-ware sugar scoop (later replaced by metal), child's size flour sifter.
- Toy Set II. Wooden road-roller, sugar scoop, small rubber truck (orange in color).
- Toy Set III. Road-roller and dump-cart combined, scoop, red beetle-ware cereal dish.
- Toy Set IV. Small red dump truck, muffin tins, scoop.
- Toy Set V. Sand sifter, wooden sand shovel, small truck.

Due to the unavailability of the road-roller and dump-cart combination, it was necessary to substitute a wooden dump truck in the Athens pairings, for which toys were combined as follows:

- Toy Set I. Wooden train (engine and one freight car), metal sugar scoop, medium-sized flour sifter.
- Toy Set II. Small wooden ferry boat, sugar scoop, enamel sauce pan.
- Toy Set III. Small blue dump truck, muffin tins, sugar scoop.
- Toy Set IV. Sand sifter, wooden sand shovel, small truck.
- Toy Set V. Larger wooden dump truck, sauce pan, sugar scoop.

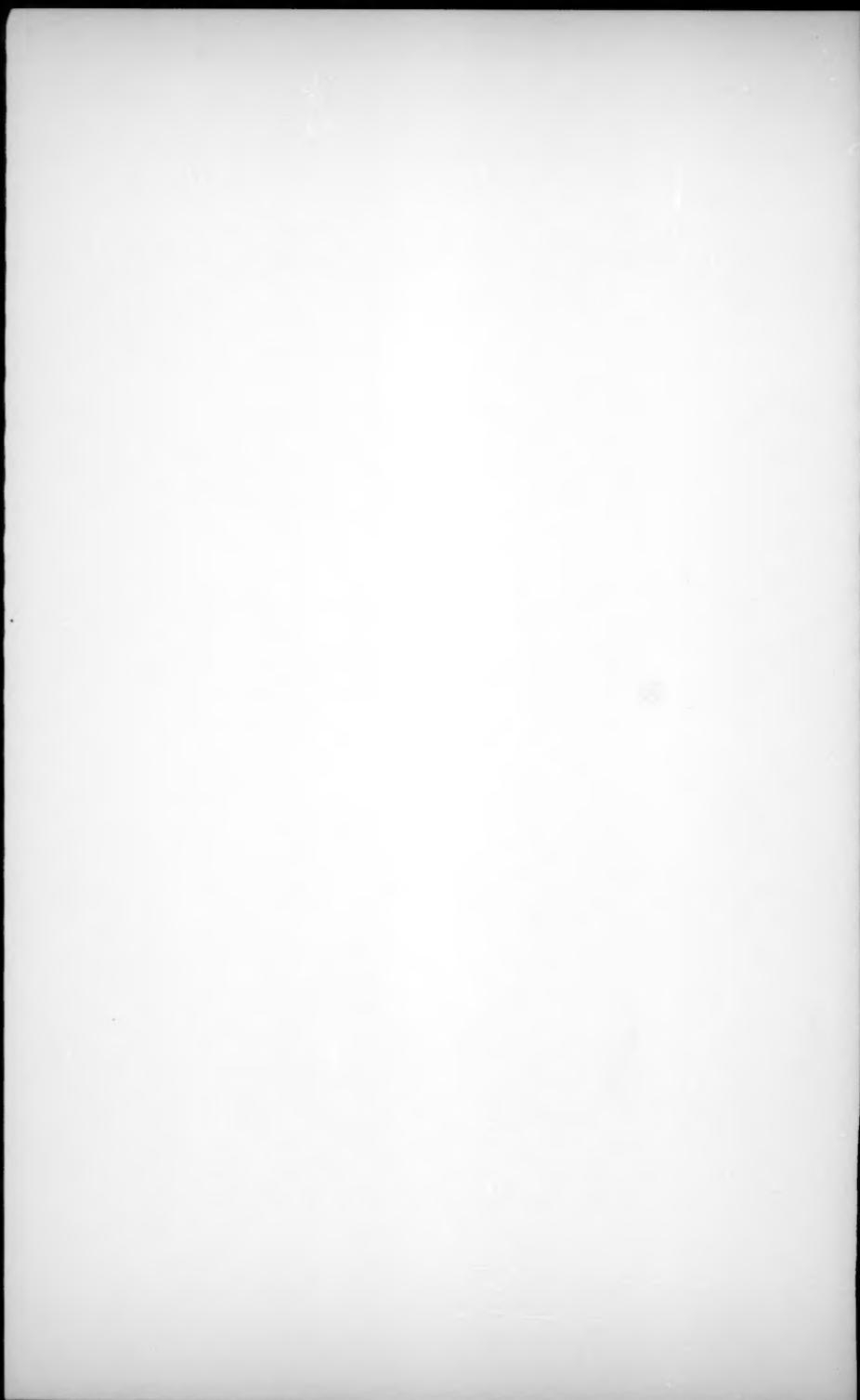
DEFINITIONS AND COMPUTATION OF SCORES

Each child's ascendance score was based on his ascendant behaviors in 5 five-minute pairings, each with a different companion and a different set of toys. For a comparative study such as this, it seemed to the writer that the types of scores that could be interpreted the most easily and meaningfully were as follows:

1. The f-score, which represents the frequency of a child's attempts, both acceptable and unacceptable. This tells us how much he tries to control the situation.

FIGURE 1. Toys used in Iowa City Ascendance Experiment





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2. The %-success score, or the percentage of his attempts that are successful. This tells us how effective his attempts to control the situation are. It is computed by dividing the total number of successes, both positive and negative, by the total number of both acceptable and unacceptable behaviors.
3. The combined average social acceptability score. This tells us how acceptable, on the average, his techniques are. It is computed by dividing a child's combined score by the sum of his combined attempts and successes; that is, by both acceptable and unacceptable attempts and successes. The combined score is defined later.

Although none of these three scores was employed in the earlier study by the author, they are almost identical with the breakdown of scores computed for the trained and control children in order to determine the exact nature of the changes produced in the scores of the trained children (7). The f-score was first used with Athens five-year-olds (8).

PAIRINGS OF IOWA CITY AND ATHENS NURSERY SCHOOL CHILDREN

The Iowa City pairings were of necessity made within each of the two groups of children, which were differentiated chiefly, but not wholly, on the basis of chronological age, so that there was some overlapping. Ascendance scores of the Athens children were obtained by pairing three-year-olds with three-year-olds and four-year-olds with four-year-olds. This method of pairing seemed the most comparable to that used in Iowa City. This report represents one section of a larger study for which the ascendance of the Athens three- and four-year-olds was measured in January-February 1948 and again in May, and initial scores were obtained on a group of 27 Athens five-year-olds (8). Ascendance scores of every child tested were utilized in one analysis included in this paper.

ODD-EVEN RELIABILITIES ON NEW TYPE SCORES

Odd-even reliabilities for these new types of scores were calculated on the initial scores of the 33 Athens three- and four-year-old children. It was decided to accept scores with reliabilities of anything over .50 as sufficiently reliable indicators of children's behavior to use in comparisons between groups. When pairings 1 and 3 were correlated with pairings 2 and 4, odd-even reliabilities of .53, .33, and .02 were obtained for the f-score, the combined average acceptability score, and the %-success score,⁴ respectively. When raised by application of the Spearman-Brown formula to express the reliability of a test two and one-half times as long, these figures became .74, .55, and .04. Since the criterion of .50 was selected to represent satisfactory test reliability, the %-success score was discarded and the com-

⁴ For this calculation, the sum for pairings one and three of the total successes both positive and negative, was divided by the corresponding sum of attempts.

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lined score used previously (7) was substituted in order to include in the comparison the component of success of behavior. The odd-even reliability of the combined score was .66, raised to .83 by the Spearman-Brown formula. In this weighted score, all of a child's ascendant behavior is taken into account by subtracting his unacceptable ascendant acts from the score in acceptable ascendance used in earlier studies. It is computed as follows: the products of the frequencies, both attempts and successes, for each category times the acceptability weightings are calculated. The combined score is the algebraic sum of these products for both acceptable and unacceptable behaviors, which are given positive and negative weightings, respectively. Thus in all northern-southern comparisons, the following scores were used: f-score, combined average acceptability score, and combined score.

THE EFFECT OF THE COMPANION'S AGE ON A CHILD'S SCORE

Because of the difference in age groupings in the University of Georgia and the University of Iowa Nursery Schools, the age range of the companions with whom any one child was paired differed in the northern and southern groups. Before making a statistical analysis of the data of the two groups, it was therefore necessary to determine whether the scores of the two groups were comparable, that is, whether the northern and southern groups were comparable with respect to with whom they were paired. The question to be answered here was: Does the age of the companion affect a child's ascendance score on individual pairings? This question was answered for each of the three scores used in the comparison, since the relationship might be different for the different scores; for example, a child's ascendance might change in the amount of interaction (f-score) but not in acceptability (average acceptability of combined score).

First, to determine the linearity or curvilinearity of any existing relationship, each child's score on each pairing and the difference between the two children's ages at that pairing were plotted on a scatter diagram. In the case of each of these three types of scores, the score on each pairing was plotted in terms of its deviation from the mean of the scores for the five pairings. Initial scores were plotted on two separate graphs, one for the total group of Iowa City three-, four-, and five-year-olds thrown together; and one for the total group of Athens three-, four-, and five-year-olds, including eight children who were first tested during the May pairings. None of these scattergrams indicated the presence of a curvilinear relationship. In each case, there was a very low order of linear relationship.

Partial correlations⁵ were run to determine the coefficient of correlation when the factor of age is held constant. In this analysis, the scores used

⁵ Lindquist (5) p. 249, formula 47,

$$r_{12-3} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{(1 - r_{12}^2)(1 - r_{23}^2)}}$$

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were the initial scores used for the scattergrams. Scores on only one pairing, the third, for each child were used to give an approximation of the partial correlation for the five pairings. These partial correlations for the group of 68 Athens children were .10, .04, and .05 for the f-, combined average acceptability, and combined scores, respectively. Corresponding coefficients for the Iowa City group of 42 were .10, -.15, and .06.

To test the significance of these partial correlations, the following formula (10) was used, in which r is the partial correlation and k is the number of variables held constant:

$$t = \frac{r}{\sqrt{\frac{N-k-2}{(1-r^2)}}}$$

This analysis showed that none of these partial correlations is significant, and indicated that in the case of each of the scores for both the Iowa City and the Athens group, there is no relationship between a child's score and the age of the child with whom he is paired. These results must be interpreted as holding only for groups where pairings are made within the age ranges used in this study. Thus, the conclusion may be drawn that the ascendance scores of the children used in this study were not influenced by the ages of the companions with whom each was paired. For the purpose of the northern-southern comparison, we may conclude, therefore, that the data obtained in this study are comparable with respect to with whom the children were paired, and that in all analyses, the scores may be used as obtained without any adjustment being made.

CRITERIA FOR SELECTING NORTHERN AND SOUTHERN CHILDREN

For the purpose of determining whether a child was northern or southern, parents were asked to fill out a questionnaire giving the child's birthplace and the following information for both parents and for the four grandparents: 1) birthplace, 2) when each moved to the South if not born here, 3) whether each considers himself a Northerner or a Southerner, 4) whether a grandparent, either northern or southern, is living in the home and thus might influence its culture. Results were tabulated, and three judges allocated the children to one of four groups: 1) southern, 2) northern, 3) southern leaning, or 4) northern leaning. Only children being reared in the South, born of two southern parents were considered southern; while only children being reared in the North of two northern parents were considered northern. On the basis of these criteria 12 children were eliminated from the Athens group of three- and four-year-old children in all comparisons of southern and northern children, and eight children were eliminated from the Iowa City group. The two Iowa City five-year-olds were eliminated because of age. This leaves a group of 29 southern and 32 northern children. It is interesting to note that 18 of the 41 Athens nursery school children are three generations straight southern, and an addi-

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TABLE I
SCORES OF THREE- AND FOUR-YEAR-OLD SOUTHERN AND NORTHERN CHILDREN BY SEX

Group	S O U T H E R N				N O R T H E R N			
	N	Age	Range	Mean	N	Age	Range	Mean
f - s c o r e s								
3-year Boys	7	37-46	40.0	26-63	47.85	9	37-47	43.33
3-year Girls	7	38-46	42.57	35-61	45.99	7	42-47	44.43
4-year Boys	9	49-59	54.45	28-69	46.44	8	49-56	51.5
4-year Girls	6	49-58	53.0	34-84	54.33	8	48-59	54.38
c o m b i n e d s c o r e s								
3-year Boys	7	37-46	40.0	67-180	95.05	9	37-47	43.33
3-year Girls	7	38-46	42.57	38-145	101.3	7	42-47	44.43
4-year Boys	9	49-59	54.45	50-188	108.43	8	49-56	51.5
4-year Girls	6	49-58	53.0	42-218	127.15	8	48-59	54.38
c o m b i n e d a v e r a g e a c c e p t a b i l i t y s c o r e s								
3-year Boys	7	37-46	40.0	.68-1.80	1.36	9	37-47	43.33
3-year Girls	7	38-46	42.57	.66-1.86	1.37	7	42-47	44.43
4-year Boys	9	49-59	54.45	.92-2.03	1.55	8	49-56	51.5
4-year Girls	6	49-58	53.0	.82-2.02	1.60	8	48-59	54.38

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tional 6 have only one northern grandparent. This number undoubtedly would have been much larger before the influx of veterans since the war.

IS THERE A DIFFERENCE IN ASCENDANT BEHAVIOR OF BOYS AND GIRLS?

To determine whether to compare northern and southern means for boys and girls separately, the mean scores by sex were calculated for three-year-olds and four-year-olds separately to see if there was a difference. Table I gives the age and mean scores of boys and girls for the northern and southern three- and four-year-olds separately. Inspection of these means indicates that there is no consistent trend.

Fisher's *t*-test⁶ for the significance of a difference between the means of independent small samples was employed to determine the statistical significance of these sex differences in means. Mean scores of southern three-year-old boys were compared with mean scores of southern three-year-old girls. The same comparisons were made for southern four-year-olds, and for northern three-year-olds and four-year-olds separately. Since none of these differences is significant, the comparison of northern and southern children was made between the total groups of three- and four-year-olds without reference to sex.

COMPARISON OF NORTHERN AND SOUTHERN CHILDREN IN ASCENDANCE

Table II presents the mean scores for the 29 southern and the 32 northern children included in the comparison. Slight differences in mean scores in favor of the southern group are indicated except in the case of the combined average acceptability score where there is a difference in favor of the northern group in the case of the three-year-olds, and no difference in the case of the four-year-olds.

The Method of Analysis

Fisher's *t*-test for the significance of a difference in the means of independent small samples was used to determine the significance of these differences in means of northern and southern children. Southern three-year-olds were compared with northern three-year-olds and southern four-year-olds with northern four-year-olds. The *t*-test was employed in these comparisons to test the hypothesis that the two samples were drawn at random from the same or identical populations, and that any obtained differences in mean scores of the two groups could be due to fluctuations in random sampling.

⁶ This formula is given in Lindquist (5), p. 57.

$$t = \frac{M_1 - M_2}{\sqrt{\left[\frac{\sum d_1^2 + \sum d_2^2}{n_1 + n_2 - 2} \right] \left[\frac{1}{n_1} + \frac{1}{n_2} \right]}}$$

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TABLE II
ASCENDANCE SCORES OF SOUTHERN AND NORTHERN CHILDREN

Group	N	S O U T H E R N				N O R T H E R N				Mean	S.D.	S. D.	S o u . — N o r .		
		Age (months)	Range	Mean	S.D.	Age (months)	Range	Mean	S.D.						
f - s c o r e s															
3-year-olds ..	14	37-46	41.3	3.5	26-71	47.7	12.8	16	37-47	43.8	2.6	16-77	41.1	17.6	6.6
4-year-olds ..	15	49-59	53.9	3.3	25-74	48.3	14.8	16	48-59	52.9	3.3	14-90	48.1	21.2	.2
c o m b i n e d a v e r a g e a c c e p t a b i l i t y s c o r e s															
3-year-olds ..	14	37-46	41.3	3.5	.66-1.86	1.36	.42	16	37-47	43.8	2.6	.86-2.55	1.50	.47	-.14
4-year-olds ..	15	49-59	53.9	3.3	.82-2.03	1.57	.38	16	48-59	52.9	3.3	.92-2.15	1.57	.36	0
c o m b i n e d s c o r e s															
3-year-olds ..	14	37-46	41.3	3.5	48-206	98.2	52.6	16	37-47	43.8	2.6	43-228	86.3	45.2	11.9
4-year-olds ..	15	49-59	53.9	3.3	42-218	115.9	50.7	16	48-59	52.9	3.3	34-287	114.6	70.9	1.3

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The Results of the Analyses

The results of the analyses of the differences obtained in the scores of the northern and southern children indicate that in the case of each of the three scores the obtained differences were not significant for either the three- or the four-year-old groups, and therefore could be due to chance factors alone. There is the possibility that although individual age-level *t*'s are not significant, there might be a significant difference in the groups as a whole. Since it is possible to combine individual age-level *t*'s when differences are in the same direction but not significant, this was done in the case of the *f*-score and the combined score, although casual inspection of the levels of confidence (85 per cent to 30 per cent) would indicate that no significant differences would be found. The method used for combining these age-level *t*'s was as follows: first, the sum of the squares of the two age-level *t*'s was computed; second, the level of confidence of this sum was obtained from a table of X^2 ,⁷ using two degrees of freedom. (The degrees of freedom are equal to the number of *t*'s.) Neither of these combined *t*'s was significant.

The results of the analyses of these data therefore do not bear out the observation of some nursery school teachers that northern children are more assertive than southern children. Rather, they indicate that when compared in ascendancy as defined and measured in this study, no difference exists in groups similar to these groups. In interpreting these results, the small number of cases should be kept in mind. It should also be mentioned that previous studies of children in Iowa City have obtained differences (significance not tested) in the *Jack* score for different groups each composed mostly of northern children. The *Jack* score, however, has not been used in this comparison. Furthermore, scores for both groups of children used in this study were obtained by one investigator.

The question arises as to whether the observation of nursery school teachers has been inaccurate, or whether this experimental situation failed to measure an existing difference. Several possibilities occur to the writer. First, does the difference which teachers have noticed manifest itself between children or only in an adult-child relationship? This study measures assertiveness as it occurs between peers. Second, is the ascendancy of southern children in their relationships with each other "toned down" by the presence of a southern teacher who represents to the child a southern culture? If so, in the experimental situation, this source of influence was removed. The investigator, although she sat in the experimental room, did not comment in any way on the children's behavior, and had no contacts with the children outside of the testing situation. In their minds she was identified with "the games." Nor could she in her unconscious reactions typify the southern culture, being herself a Northerner with no previous experience in the Deep South.

⁷ Lindquist (5, p. 36).

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VALIDITY OF EXPERIMENTAL SCORES FOR NORTHERN AND SOUTHERN CHILDREN

If the ascendancy of southern children is "toned down" by the presence of southern teachers but not by a northern investigator, one might expect to find that the ascendancy scores were less valid for southern than for northern children. This did not seem to be the case, however. Although teacher ratings are not a very satisfactory measure of validity, the validity coefficients obtained by that method are presented for what bearing they may have on this question.

Validity coefficients were obtained on both initial and final data of the Athens children using the same types of teacher ratings as were used with the Athens five-year-olds (8). These differed from the Iowa City ratings in only one respect; i.e., the definition for the four large divisions of methods was somewhat simplified. The correlation of these ratings with initial experimental data on frequency of attempts, frequency of success, and frequency of methods yielded the following ranges of coefficients for combined and individual teachers: .37 to .57 for frequency of attempts, .14 to .50 for frequency of success, and $-.48$ to $+.74$ for frequency of methods when grouped into four large divisions. All three coefficients for the half-day group ($N=18$) on frequency of attempts showed a positive relationship significant at the 5, 2, and 1 per cent levels, whereas none of the corresponding coefficients for the all-day group ($N=15$) was significant but all were in a positive direction. Although none of the coefficients on frequency of success was high enough for significance with such a small number of cases, they were all in a positive direction. The only significant coefficients on general type of method were those for Division C when the half-day combined teachers' rating was compared and for Division D when the all-day combined teachers' rating was compared with experimental frequencies. Although all correlations for the half-day group were in a positive direction, 50 per cent of those for type of method in the full-day group were in a negative direction (Divisions A and C). It should be noted that none of these teachers was accustomed to the use of rating devices.

Because of this inexperience of the teachers, validity coefficients were computed for final scores also. When ratings were compared with final experimental data, some significant coefficients were obtained in both groups of children ($N=16$ for each) for frequency of attempts, the range being from .22 to .66. None of those for success, with a range of .01 to .37, was high enough for significance. In the case of general type of method, these validity coefficients on final data range from $-.36$ to $+.62$, with 6 being high enough for significance, and a general trend toward a positive relationship being apparent in both groups. Significant correlations were obtained for each of the four large divisions of method.

Corresponding coefficients for the Iowa City groups ($N=19$ and $N=23$) were as follows: .36 to .79 for frequency of attempts, all but one being significant at the 1 per cent or 5 per cent level; .02 to .36 for frequency of success, none being significant; and $-.04$ to $+.63$ for general type of method, two

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being significant at the 5 per cent level, and a general trend toward a positive relationship being apparent in both groups. The coefficients for type of method were obtained for final scores ($N=13$ and $N=20$). The Athens validity coefficients compare favorably with those for Iowa City children, and therefore indicate that the ascendance measure is as valid for southern as for northern children.

SUMMARY

The purpose of this study was to compare the ascendant behavior of southern and northern three- and four-year-old children. The subjects were a group of 41 children in the University of Georgia Nursery School and a group of 42 children in the University of Iowa Preschools. Both groups were above average in intelligence and in socio-economic status. Scores were obtained in a controlled play situation, consisting of a small box of sand containing three toys. The measure consisted of 5 five-minute pairings each with a different companion and a different set of toys. Odd-even reliabilities on the scores of the Georgia children were determined for three new types of scores which seemed to be the most meaningful for a comparative study. These reliabilities were .74, .55, and .04 (Spearman-Brown) respectively for frequency of attempts (*f*-score), average level of acceptability, and %-success. The combined score with a reliability of .83 (Spearman-Brown) was substituted for the %-success score in order to include in the comparison the factor of success of behavior.

Partial correlations indicated that a child's score is not affected by the age of the companion with whom he is paired, within the age ranges used in this study, and that no adjustment in scores would be necessary before making the northern-southern comparison. An analysis by Fisher's *t*-test to determine whether to compare northern and southern means for boys and girls separately indicated no significant sex differences.

Rigid criteria were set up for selecting southern and northern children from the total Athens and Iowa City groups. When mean scores of 29 southern children were compared with mean scores of 32 northern children by Fisher's *t*-test, no significant differences were found in *f*-scores, combined average acceptability scores, or combined scores; that is, in frequency of ascendant behavior, in acceptability of the child's method, or in the combined score taking success also into account. The results do not substantiate the observation of some nursery school teachers that southern children are less assertive and use more acceptable techniques than do northern children similar to the subjects of this study.

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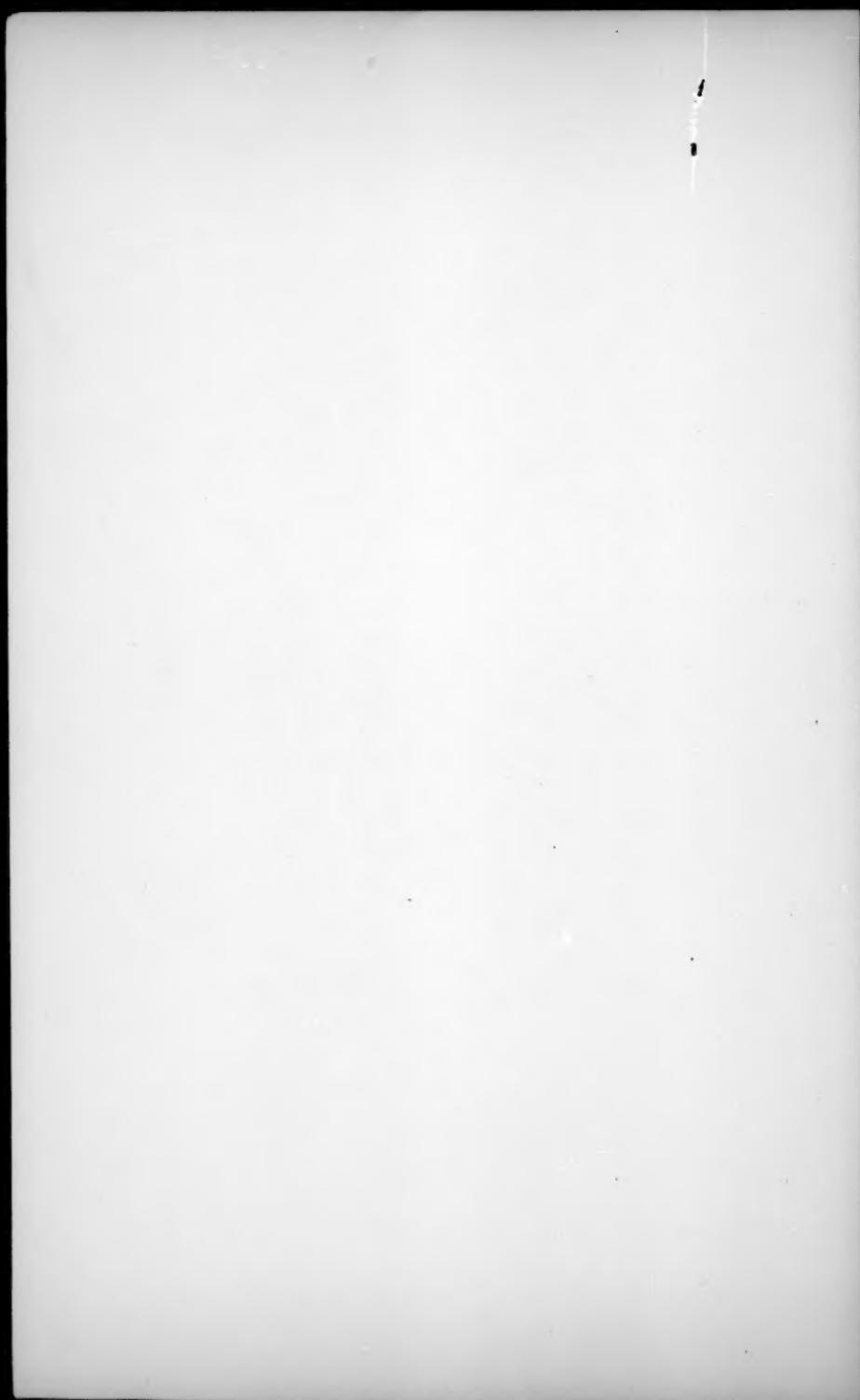


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